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Contact Address:
Prof. Dr. Aytekin İŞMAN
TOJET, Editor in Chief
Sakarya-Turkey

Message from the Editor-in-Chief

Dear Colleagues,

TOJET welcomes you.

TOJET would like to thank you for your online educational interest. We are delighted that more than 10000 educators, teachers, parents, and students from around the world had visited the July, 2023 issue between July 01 and September 31, 2023. It means that TOJET has continued to educate academic people on new developments on educational technology around the world since October, 2002. We hope that the volume four, issue one will also successfully accomplish our global educational goal.

TOJET and other international universities will organize International Educational Technology Conference 2024 (www.iet-c.net), between August 23-24, 2024

October 01, 2023

Editors,
Associate Prof. Dr. Aytekin İŞMAN
Sakarya University

Prof. Dr. Jerry WILLIS
Louisiana State University

Editorial Board

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"I Like to be Independent": Experience of Visually disabled Students with Online Learning in Saudi Arabia

Alaa Alnajashi
King Abdullaziz University
aaalnajashi@kau.edu.sa
ORCID ID: 0000-0003-1332-7347

Sumyah Alnajashi
King Saud University
salnajashi@ksu.edu.sa
ORCID ID: 0000000240286627

Arwa Alnajashi
Aramco
Arwa.alnajashi@aramco.com.sa
ORCID ID: 0009-0001-5524-9968

ABSTRACT
Online learning has long been essential in universities, and during the COVID-19 pandemic, it became obligatory for all students. This new circumstance entailed advantages and disadvantages for online learners. As disabled students have their own needs, and as each disability is related to specific kinds of needs, in this paper, we focus on online learning experiences for visually impaired students. We conducted online interviews with eight university and college students from several regions in Saudi Arabia to explore their perspectives on the advantages and disadvantages of online learning. We also asked them for suggestions on how to improve their online learning experiences. Based on a thematic analysis of the results conducted using NVivo, we found that students' attitudes towards online learning are positive, as they are related to increased autonomy. However, their experiences with teaching forums and methods of online teaching and assessment involved many obstacles. They attributed most of these obstacles to a lack of technical support and some lecturers' lack of awareness regarding their needs. The students suggested the continuous development of platforms for compatibility with screen readers, as well as continuous training and technical support.
KEYWORDS: Accessibility, Learning experience, Online learning, University students, Visual disability

1. Introduction
1.1 Visual Disability in Saudi Arabia
A recent national survey in Saudi Arabia found that 2.9% of Saudi citizens are disabled. Visual disability comprises 46% of all disabilities (GaStat. 2022). The government website of the rights of people with disabilities indicates that there are over 811,000 visually disabled individuals in Saudi Arabia (Saudi national portal for government services, 2022). Although statistics on the number of visually impaired students who attend colleges and universities are unavailable, most universities in Saudi Arabia announce the availability of special services for visually impaired students and state that they have several students with visual impairment on their websites (Deanship of Students' Affairs, 2022), (Special Needs Center, 2022).

1.2 Visual Disability and Technology
Visually disabled individuals use two types of technologies: mainstream technologies such as smartphones and assistive technologies such as screen readers, magnifiers and braille devices (Mingzhe, et al., 2021). Assistive technologies for visually impaired students are manufactured all around the world and imported by many companies in the Middle East (Boundlessat, 2022). Blind societies and universities in Saudi Arabia work to update visually impaired individuals with new assistive technologies. Exhibitions of assistive technologies for visually impaired individuals periodically invite companies that produce assistive technology (Ibsar Society. 2022; Association for Blind, 2022).

Recent studies in Saudi Arabia found that university students with disabilities are informed about the existence of assistive technologies and are aware of the importance of these tools. Students emphasised the importance of using assistive technologies to access learning materials (Ali, 2017; Dodi and Ibrahim,2017; Almalki, 2021). For example, a qualitative study in one of the Saudi universities interviewed 14 visually impaired students and indicated that, aside from academic difficulties, students prefer to use assistive devices when studying and writing their exams, rather than exploiting a scriber (Almalki, 2021).

With regard to visually impaired university students' experiences with assistive technologies, a small body of research in Saudi Arabia and surrounding Arabic countries has raised concerns about the quality of Arabic screen readers and magnifiers (Alani, 2021; Almalki, 2021; Ali, 2017; Dodi and Ibrahim, 2017; El-Din, 2018; Hife, 2019). Studies have also raised issues about the accessibility of websites and learning materials (El-Din, 2018, Hife, 2019). For example, a study conducted in an Arabic university found that guidelines for accessibility were missed in half of the required features (El-Din, 2018). Studies have also indicated that visually impaired students consider inaccessible textbooks in universities to be their most difficult obstacle towards their academic success. Visually disabled students complain that lecturers suggest key reading materials and textbooks at the beginning of each term without considering whether the materials are available in electronic format. Students cannot bear the cost of transferring paper books to electronic copies and need electronic materials to either read them via screen readers or magnifiers or transfer them to Braille via Braille devices (Almalki, 2021).

It was found that disabled people's perceptions of assistive technology are related to their situations (Bajcar, 2020; Mingzhe, et al., 2021). Persons with disabilities indicated higher levels of satisfaction with assistive technology compared to persons without disabilities, although both groups showed similar perspectives on the efficiency of assistive technology (Bajcar et al., 2020). Despite quality issues, students' acceptance of assistive technology is moderate (Ali, 2017; Almalki, 2021; Hife, 2019; Alani, 2021). Students even seem to use assistive technology for entertainment and communication via social media (Hife, 2019).

1.3 Online Learning
When the need for online learning emerged following the outbreak of COVID-19, a body of research explored students' experiences with online learning around the world (Zhu,2020; Mukhtar et. Al, 2020; Chung, 2020). As the experiences of visually impaired university students differ from those of others (Liakou and Manousou, 2015; Vision impairment and blindness, 2020; WAI, 2021) we aimed to explore the advantages and disadvantages visually impaired university students faced with online learning and to obtain their suggestions for improving the online learning experience. Answering these questions will have implications for the development of assistive technologies, improve their use in practice and yield guidelines for teaching and administration faculties in colleges and universities to establish an environment that supports the autonomy of students with visual impairment.

The theoretical framework we adopted for this study is based on Vygotsky's (1978) sociocultural theory. This theory emphasizes the significance of collaborative learning and social interaction in online environments. It also highlights the role of cultural and societal influences in shaping learners' experiences and the use of tools, such as digital platforms, to mediate learning.

2. Method
2.1 Participants
We aimed to recruit university and college students with visual disabilities who studied online from all main geographic regions in Saudi Arabia and conduct semi-structured interviews until we reached saturation (i.e., until recruiting additional participants did not add new, essential information) (Cresswell, 2013). We detected consistent themes among six participants and added two more participants to ensure saturation.

Recruitment was conducted through announcements on social media (i.e., we contacted blind individuals who are active on Twitter or Snapchat and they distributed the link of the study). We also contacted university students with visual disabilities to post the study in WhatsApp groups for students with visual disabilities. All procedures were carried out with the approval of the institutional review board at King Saud University.

Although we announced the study to males and females and targeted both groups, all eight participants were female. No male students responded to the announcement, apart from two male students who registered in the study and then withdrew before booking an interview slot. Another 13 participants signed up for the study, but they either had not experienced online learning (two participants), failed to provide valid contact information (five participants) or withdrew from the study before the interview (six participants).

The ages of the eight participants who were interviewed for the study ranged between 18 and 45 years (mean = 27.35; SD = 8.05 years). Their courses were all in Art and humanity sciences, including social sciences, education policy, religious studies and general management. Table 1 shows information about each participant, including their age, level and onset of visual disability and course type.

Table 1. Information about participants' level, age of disability and the course

N	Age	Level of disability	Age of disability	Period of online study (Academic terms)	Degree	GBA (course Average)
1	18	Blind	Birth	1	BA	A
2	25	Partially sighted	Birth	8	BA	C
3	26	Blind	Adolescence	2	MA	A
4	45	Blind	Adulthood	6	BA	B
5	30	Blind	Birth	3	Diploma	-
6	27	Partially sighted	Birth	3	BA	B
7	21	Blind	Birth	3	BA	B
8	27	Blind	Birth	4	Diploma	-

2.2 Interview Procedures

All interviews were conducted online via Zoom, except for one interview, which was conducted via phone call. The interviewer was one of the researchers, and the interviews lasted between 25 and 40 minutes. The researcher sent the consent form to the participants in a text document via WhatsApp prior to the interviews. The researcher commenced the interview with an introduction to the research team and the study aims, asked the participant for permission to record the interview and read the consent form, and the participants gave their approval verbally.

To answer the study questions, the researcher asked students about their experiences with learning platforms and applications used in online learning and how they accessed them. The researcher asked them about their practices when attending lectures, working on and submitting assignments, writing closed exams and communicating with staff and students. The researcher then asked them what challenges they faced in online learning. The researcher asked them about the support they received from the university centres for special needs (if it existed) and from staff. The researcher asked them to reflect on which personal and technical skills they perceived to be valuable tools for success in online learning. The researcher then asked them to compare online learning with on-site learning. The researcher asked them for their suggestions to improve the online learning experience for visually disabled students. Finally, the researcher asked the participants for their demographic information. We left the demographic information to the end to decrease the participants' reluctance to share information at the beginning.

2.3 Method of Analysis

This section presents the important qualitative findings and procedures used to analyse the data. Transcripts of the recordings of the interviews were written manually by one of the researchers. A sample of three recordings was double-checked to ensure the reliability of the transcripts (Cresswell,2013). Data sets were uploaded to NVivo (Version 12) and prepared for coding, which entailed labelling similar ideas with codes (Cohen,2011) . We followed the inductive coding (bottom-up) approach and the qualitative data were analysed using thematic analysis. We coded the data under suitable themes, creating sub-categories of the main themes when needed. We relied on a combination of both across-case analysis and within-case analysis, as 'neither across-case nor within-case approaches alone enable the researcher to interpret an experience both through its parts and as a whole, such that readers can recognize individual experience in a generalizable way' (Ayres et al. , 2003). Thus, we commenced with analytical immersion within each case to get a sense of the students' online learning experiences. We then moved to across-case analysis, identifying overall themes from all seven cases. The coding process was iterative and was mostly conducted at the sentence level. The researchers added multiple codes to sentences that contained several ideas. We noted overlaps in our reflection notes. We kept reflection notes on a shared Goggle drive throughout the coding process, which eventually assisted us in understanding the students' online learning experiences. After completing the coding process, we finalised the name of each theme and made sure that each theme was not complex. When needed, categories were fitted under overarching themes. We also reduced redundant themes.

The codes and themes and all analysis procedures were checked using a member check method by another researcher on the team to validate the authenticity of the analysis (Cresswell,2013). In the case of a contradiction, the two researchers discussed the codes' definitions and how the codes relate to each other's. There were initially seven overarching themes, which the coders reduced to five.

3. Results

Table 2 presents the final themes along with categories, codes and frequency of magnitude coding. The aim of counting frequency was not to quantify the data but to follow a systematic approach in choosing and organising extracts and determining students' overall attitudes towards online learning. The results in this section are not reported according to the frequencies of the themes, but rather are organised according to the research questions.

Additionally, magnitude coding, which consists of 'adding supplemental alphanumeric or symbolic codes or sub-codes to an existing coded datum or category to indicate its intensity, frequency, direction, presence, or evaluative content' (Saldaña,2013), was added to some of the main themes to get a general sense of participants' overall learning experiences. Some examples in the context of online learning experiences are 'positive', 'neutral' and 'negative'.

Overall, there were five main overarching themes: general online learning experiences, social interaction in the learning environment, learners' attitudes towards online learning, use of technologies (advantages and disadvantages) and students' suggestions for improving online learning.

With regard to the technologies used and their magnitudes, online platforms included Zoom, Blackboard (7), distance learning via the university website (1), Google Meet (2), and Microsoft Teams (1). Students used two main methods to access forums and applications: accessibility tools and personal assistance. Accessibility tools included magnifiers for partially sighted students, screen readers such as NonVisual Desktop Access (NVDA) (2), and voiceover (7). Personal assistance included guidance from family members or volunteers on how to access forums, notetakers and volunteers for typing and recording lectures.

Table 2. Themes identified in the qualitative analysis

Overarching themes	Categories	Magnitude coding		
		+	-/+	-
General Online experiences	Online lectures	(4) Ease of communication and discussion with teachers and classmates		(3) Not able to participate online Lack of support on how to access the materials Struggled in the beginning Lack of training
	Course work/ assignments	(3) Using word processor Send via email Very easy and convenient, with the help of the support group Assistance from personal assistants	(2) Depends on students circumstances	(2) Not able to do PowerPoint Struggled with statistics Struggled in using calculators
	Online Exams	(2) Easy via phone	(1) Need assistance from family members	(2) Prefer on campus exams Lack of support Lack of clear guidelines Extremely difficult Requires assistance from note taker
Social interaction in learning environment	Communicatio-n with lecturer	(7) via email via WhatsApp Very easy and convenient Very supportive lecturers	(1) No nee d	(1) Prefer physical attendance .

Communication with classmates	(4) Very easy Convenient WhatsApp Via Telegram	(1) Never needed via	
Support from instructors during the online learning	(1) very supportive	(1) No special support	(3) No support Cannot access the slides Rely on listening Lack of understanding from instructors
Used technologies	(7) Zoom is very accessible (4) Microsoft is accessible (1) Blackboard is accessible with NVDA (1). Feeling of independency and relying on help from technology rather than from people.	(13) Accessibility issues with blackboard Lack of support from the university Technical issues. Lack of training for the students Dependency on others to access the platform.	
Learners Attitudes towards Online learning	(3) Easy and convenient Extremely positive, specially with screen readers and voice overs	(4) Hard Frustrating Lack of support Prefer face to face	

3.1 General Online Learning Experience

It was obvious that the general online experience varied depending on the learning activities. When attending lectures, students found online lectures to be a struggle at the beginning, as they did not know how to access the platform and lacked training or support. This is reflected in a quote from one student: "The nice thing about Blackboard is that the slides are available in readable text format while the teacher is explaining.... I guess there is a feature which I should activate and the slides become available as texts. Honestly, I did not know about this... This feature is available in some subjects, but not in others." The student is probably pointing to the share file vs share screen features. When a lecturer shares their screen, the slides appear to students as images and the screen reader does not read the text; however, when the file share feature is used, the text becomes accessible. It seems that the student was unable to enjoy this important feature of Blackboard because neither the students nor the lecturers were trained on the accessibility of presentations online. Nevertheless, some students prefer online lectures because they facilitate participation in discussions during lectures.

The students encountered different submission requirements for assignments. Their situations also affected the chosen method. One student said, "I wish I knew how to read braille and use braille sense when giving presentations. One of my blind friends does not struggle with presentations, as during her presentations, she can use braille sense.... When I give presentations, I use my smartphone to join the room and attach another phone to my headphones to read the points that I am explaining via voiceover." In fact, making presentation slides to be presented was one of the most difficult tasks for the students. Completing assignments for statistics was also difficult, as the students were not aware of complex calculators using voiceover. Moreover, statistics software is incompatible with screen readers.

By contrast, assignments in the form of an essay or report are accessible. Students can type their assignments into Word files using screen readers or magnifiers and email them to their professors using assistive tools. However, some tasks require help from family members, personal assistants or volunteers. As one student stated: "When I wanted to format the text, I would send it to my sister via WhatsApp, and she would do the formatting." Another student commented on the discussion board on Blackboard: "I used to not open Blackboard. I used to depend on my personal assistant, whom I asked to open the assignments and write the answers on Blackboard."

Online exams entail many obstacles for students with visual disabilities. The students lacked training, could not find support and found that the online exams were extremely difficult to access. "My family opened the test via my smartphone. I did not like to proceed with answering the questions by myself. I feared I might skip a page or question, as I had not received training," one student said. Even in an online learning context, some tests require physical attendance on campus, and hence, students require help from personal assistants or scribers.

Some students expressed satisfaction with the alternatives provided by lecturers. For example, one student said, "I told my lecturer that I cannot perform the online test on my own. She said that one member of my family could read and write for me during the test. She said this to all blind students because they otherwise would not have had enough time to complete the tests." Some students also preferred verbal exams over written exams. This opportunity is available through online learning and the types of homework exams that lecturers feel are not applicable to students with visual disabilities.

3.2 Social Interaction in the Learning Environment
The theme of social interaction in the learning environment included interactions with lecturers, about which the students showed an overall positive magnitude. Although visually impaired students participate in lectures alongside their classmates, some face problems with enabling their microphones when they are needed. One student mentioned that she had issues accessing her microphone when using Blackboard; this sometimes prevented her from reporting her attendance during online sessions, which she found frustrating. Outside of lectures, communication was easy and convenient via WhatsApp and emails. Lecturers seemed to vary in their willingness to communicate with students outside of lectures. Some students found that lecturers were quite willing to communicate and supportive: "Sometimes, lecturers called me to ask what support I needed." Another student said, "I did not know how to write in the online forum, so I asked the teacher if I could reply verbally, as it was very difficult for me to access the forum, and the lecturer said that was okay." By contrast, another student found that on-campus learning was a better environment for communication with lecturers. She said that some lecturers refused to be directly contacted by students and appointed student leaders as liaisons between themselves and their students.

WhatsApp appears to be the most convenient means of communication with classmates. Telegram channels and groups were also used. Most students had positive attitudes about communicating with their classmates. If needed, communication between students was easy and convenient.

Regarding the special support the students required from lecturers because of their visual disabilities, they tended to have more negative attitudes towards the available support. They noted that some lecturers did not understand their special needs. One student said, "Some lecturers say that there is no difference between sighted and blind students." She also noted that this entailed that the lecturer would not give them any special support.
By contrast, another student said the following:

Communication is not difficult. I contacted a member who is responsible for quality and accreditation and asked her to give me a number to contact the professor.... The professor writes questions without reading them, and this is one of the difficulties that I always face in lectures. The students write the answers to the questions in the chat. The professor says, "Yes … good job," and I do not know what was written.... I told the member to ask the professor to read the answers out loud, as there are blind students who cannot read them.

The student had a positive attitude towards the reply of the member, who was willing to help, welcomed any comments and said that all would be delivered to the staff and that the student could contact the staff by any means. One communication problem encountered by students with visual disabilities is their reliance on listening, as they cannot see the visual materials, which are not available in accessible form prior to lectures. One student also indicated that some lecturers' speaking was unclear because of the devices they used. Another student said, "I have some vision. When the material is magnified, I can see it. Sometimes, the whole presentation looks black. Nothing appears. I ask for help. Nothing happens. I ask my friends but find no solution."

3.3 Used Technologies
As previously mentioned, the students had to use various platforms. Zoom was the most accessible platform for students with visual disabilities. One student said that Microsoft Teams is excellent. Another explained that NVDA was compatible with both Zoom and Blackboard and that she wrote her tests and submitted assignments using these platforms without accessibility issues.

Although some platforms and features were accessible via accessibility tools, the students still faced many problems. For example, some features were inaccessible to them, and they were not sure why. For example, some

students mentioned that they were unable to enable their microphones during online lectures on Blackboard. One student said, "I have no problem logging in, but when I want to enable the microphone or raise my hand, I cannot click the buttons. I do not know whether the problem is caused by my phone or the application. I asked my friend with a visual disability, but she is partially sighted, and she said that she would close the voiceover to open the microphone." This quote reflects accessibility issues on these platforms and the lack of training and technical support these students receive from the university, as they depend significantly on their family members, personal assistants or volunteers.

Indeed, the students mentioned that what contributed most to the success of their online learning experiences was the support provided by volunteers, who helped make course materials more accessible. One student explained that she used to pay someone to read and record course materials. She later found a group of volunteers with whom she continues to work. They record the materials in whatever format suits the student's needs. This student said, "Honestly, I would not have been able to pass without the support of the volunteer groups."

One student expressed her frustration with the lack of technical support, which reflects the experiences of many participants: "It takes them ages to fix any technical issue that we face, and sometimes they provide impractical solutions that never fix the issue."

3.4 Attitudes Towards Online Learning

Overall, the participants found online learning convenient and accessible. "Personally, I prefer online learning because I do not have to worry about commuting, as I need support to move on campus, so online learning is very convenient for me," one student said. Another student expressed a similar sentiment: "The thing that I like most about online learning is the feeling of independence, as I do not need help from anyone; technology can really assist me, read and write for me, and I can refer back to recording of the lectures."

However, there are still several obstacles to ensuring that visually impaired students have positive experiences with online learning. The participants found it difficult and frustrating due to a lack of support and training. Indeed, the students expressed frustration with the lack of training. One of the participants explained that on many occasions, she felt so frustrated during the online experience and that her blood pressure dropped, and she had to be hospitalised.

However, some students expressed their preference for face-to-face learning over online learning. One student said, "I do not really like online learning, as I cannot easily participate in online classes. I prefer face-to-face learning, which allows me to participate more easily in classes."

3.5 Suggestions for Improving Online Learning

Regarding the students' suggestions for improving online learning, they believed that training students at the beginning of the online experience is a necessity. One student said, "We need training courses on computer use. In the past, we were not obligated to use computers or be trained to use computers, so our experience with computers is minimal."

Students also emphasised the need for designated technical support services. One student suggested that prompt replies to technical support requests are essential to improving online learning experiences. That is, technicians must solve problems as soon as they occur.

Students also mentioned the importance of raising staff awareness. One of the participants reported her frustration with the teaching staff and how they neglected her disability:

"We do not want their pity, and we do not expect them to make things extremely easy for us. All we need is some understanding and support, and instructors should try to understand what it is like to live in our shoes.... Can they survive and live their lives with their eyes closed? Can they manage to comprehend a challenging school subject like this without sight? Of course not.... So they just need to be compassionate".

Another student suggested assigning individuals specialised in social sciences as coordinators for disabled students:

"It is very important that the university assign someone who has a background in disabilities and special needs so that our needs can be raised with stakeholders. Right now, many stakeholders do not understand our needs and tend to neglect our requirements due to a lack of understanding. We need the university to give special attention to disabled people because, as you know, universities restrict us to certain majors."

The students' suggestions included optimising the technical aspects of the platforms. They suggested improving accessibility in the utilised platforms, especially Blackboard. One student said, "If possible, they need to improve the accessibility of Blackboard because it will be the main platform in the coming years. As far as I know, it will be the main platform for exams and assignments." Other students suggested the use of online platforms that are compatible with screen readers, such as Zoom.

Another suggestion is to provide course materials in advance of the online class so that students can make them accessible. For instance, a student can print the materials in braille and read them before the lecture. One student said, "I prefer printed materials to electronic copies." Some students also noted the importance of financial support, that some assistive devices are too expensive for students and that the universities and visual disability centres must provide students with these devices.

4. Discussion

Overall, although students have a positive attitude towards online learning, a lack of technical support and training seems to be the main obstacle. Although various assistive technologies are available for individuals with visual disabilities (Chung et al., 2020). Students seem to prefer mainstream technology (i.e. they use their smartphones' built-in voiceover and magnifier applications instead of screen readers on laptops or personal computers). As students lack training and technical support from the university, they rely on their families and friends who are better at training them on mainstream technologies. Li et al. (2021) offered a similar interpretation of why visually disabled individuals might use mainstream technology rather than assistive technology: Individuals with visual disabilities depend on family members in choosing their assistive technologies, and hence they prefer mainstream technologies (Mingzhe et al., 2021). Individuals with visual disabilities also use smartphones for entertainment and social media (Hife, 2019) and therefore have positive independent experiences with these devices compared to the frustrating experiences they face with new assistive technologies. Some students expressed not being into technology. Therefore, students with visual disabilities primarily use mainstream technologies that are widely used by the public and were created to be simple and user friendly.

When mainstream technologies fail to help students access platforms, course materials or resources, they can seek help from lecturers and request alternatives or seek help from family members, personal assistants or volunteering groups. There seems to be a conflict between students' desire to be independent and their need to remain in their comfort zones (i.e. not using new applications). For example, one student said, "I do not know how to create a PowerPoint presentation, so whenever I get an assignment that requires me to do so, I ask for an alternative, such as a research project using Word." This statement indicates a lack of willingness to learn how to use accessible programmes, such as PowerPoint, and the student is directly seeking an option that falls within her comfort zone. Learners need to be encouraged to try to learn new programmes, especially if these programmes are easily accessible.

Some of the students had a strong sense of autonomy. When one participant was asked about the training she had received, she instantly replied that she had not received any training, as she preferred to rely on self-learning.

Therefore, positive and negative attitudes were related to the students' preference for mainstream technologies versus assistive technologies, their level of expertise with assistive technology and how they solve the conflict between seeking autonomy and accessibility. These personal options and skills were found in other cultures to be the main factors for the success of disabled students, especially in the context of new experiences (Wegner, 2017; Lee,2021).

The surrounding environment also affected the students' practices and attitudes towards online learning. Lecturers' expectations of the students were either high (e.g. they did not acknowledge any differences between sighted and blind students) or low (e.g. they gave students easy alternative options that were by no means similar to the original tasks).

Students want their voices to reach lecturers, and they want lecturers to be understanding and have realistic expectations of them. Students believe that raising awareness of university staff, lecturers and administrators would be a step towards advocating for their rights to access all materials and platforms and to be trained on learning platforms and assistive technologies. Indeed, advocacy for disabled students' rights is among the main factors that affects their academic success (Wegner,2017), and their social environment and the amount of technical support influence their ability to adopt and use assistive technologies (Mingzhe,et al., 2021; Lee, 2021; Kourea, 2021; Roberts, 2011).

Participants in this study reported wanting to be trained on screen readers and computer programmes, but they have not yet started to do so. Despite their awareness of the necessity of such training, a possible reason for this delay is that they found easy alternatives, such as substituting one type of task with an easier task in their comfort zone.

Finally, the participants seemed to have low expectations from the educational system and expected the volunteers or notetakers to compensate for this lack of support. Therefore, as previously stated, students must be educated about their rights and advocate for them.

5. Limitations of the Study

As all the participants were female students, we could not verify whether male students with visual disabilities had similar online learning experiences. Additionally, we recruited students whose ages of onset of visual disability differed; however, we did not compare the experiences of those who were born with visual disabilities with those of students who became visually disabled later in life. We also did not systematically differentiate blind from partially sighted students. Further studies could focus on each type of visual disability.

Another limitation is that students reported minimal use of assistive technologies and greater use of mainstream technologies. Therefore, we could not gain insight into what kinds of accessibility issues are problematic with assistive technologies in online learning. Finally, we wanted to determine whether university students in Saudi Arabia have negative online learning experiences related to language compatibility issues. However, the students were only studying in Arabic; therefore, we could not compare the accessibility of materials and platforms in Arabic with the accessibility of those provided in other languages. Even students who had English courses could not comment on the differences between Arabic and English materials and platforms due to their minimal use of accessibility tools.

6. Conclusion

We aimed to explore the positive and negative aspects of online learning from the perspective of university students with visual disabilities in Saudi Arabia and their suggestions for improving online learning. We derived several conclusions from the thematic analysis. The students found online learning to reinforce their autonomy. However, a lack of training and technical support represented obstacles to their independence. The students always had to choose between struggling with accessibility and technical issues or sacrificing their independence for the sake of ease of use by asking other people to read, type or complete their tasks. Aspects that deprived the students of independence or raised their feelings of incompetence with technology were considered negative aspects of online learning. The students believed that training on assistive technologies is a necessity and that the whole learning environment must be adapted for them, including increasing the accessibility of learning materials and platforms, raising awareness of university staff and providing efficient technical support and training.

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Analysis of the Effects of Viral Advertising Studies on Sociological and Mass Education in Social Media and Internet Environments: An Example of Ice Bucket Challenge Advertising

Buğra Asaf TENGİZ
PhD Student, Girne American University, Faculty of Communication, Communication and Media Management. Kyrenia/ TRNC.
E-mail: bugratengiz@gau.edu.tr

Muharrem OZDEMİR
Dr. Teach Member, Girne American University, Faculty of Communication, Department of Press and Publication, Kyrenia/ TRNC.
E-mail: muharremozdemir@gau.edu.tr
Orcid: 0000-0003-1570-146X

Abstract
With the development of communication and information technologies, communication tools in the field of promotion and marketing have shifted from the traditional environment to the digital environment. In this context, the increase in Internet usage and the developing social media channels have started reaching much wider audiences. This situation has also led to transferring advertising and marketing activities to social media environments. Today, a new dimension has been added to the field of advertising, especially the environment prepared for viral ads to become influential on the masses. Viral ads, which are the subject of research, are spread by Internet users by filtering messages by people, transmitting them to another interested person and potentially transmitting and sharing the content of the message to those interested. The influence of social values on advertising, the harmony of the prepared advertisement with society and, in particular, the topics and content of the viral ads have also been affected. In this study, the analysis of the campaign of the "Ice Bucket Challenge" advertisement is included. This ad, an example of a viral ad, has been analyzed in the context of technological, corporate/brand, supporting factors, statistical success, using celebrities and opinion leaders, and its impact on education. In particular, information, awareness and awareness formation appear as essential features that attract attention within the scope of the study.
Keywords: Social Media, Advertising, Viral Advertising, Sociological and Educational Impact.

Introduction

Communication, which has become one of the indispensable elements of human life, uses various ways for individuals to communicate their feelings, thoughts and opinions. A person who can exist in society by constantly communicating uses technology very well to communicate mutual ideas and feelings. According to Mutlu (1995), communication is an area where mental fiction about the course of the world has reached even more advanced points with radical technological innovations. According to Burton (1955), all communication actions are a process. The media accelerates this process and includes large audiences in it. The main power of the media lies in shaping our worldview.

In addition to newspapers, magazines, radio and television, Internet technologies and social media elements have caused the restructuring of communication today. Interaction has also been included in human life in parallel with communication. Mass media, which have essential functions such as informing, entertaining, educating, informing and creating public opinion, also carry out advertising and promotional activities to reach and mobilize society (Kınık, 2021).

With the contribution of globalization, which affects the whole world, a substantial change has been formed in sociological, psychological and economic fields, and the environment for new changes has been prepared within the scope of communication. This environment has paved the way for people to move in interaction other than communicating. The word "public opinion" comes to the fore when people interact with each other and take action. One of the most significant effects of all mass media and social media elements on individuals and society is to create public opinion. *Public opinion* is the typical attitude or behaviour that individuals who are members of similar social groups adopt in the face of certain events. Although public opinion, also expressed as the " um of Opinions", is defined differently by certain opinions, it is also used as the emergence of an interaction in a social sense (Zafer, 2021).

Today, developments and changes in both technological, social and economic fields have also caused the traditional dimension of communication to change. In particular, the impact of social media tools and their intensity

and speed have made it easier to reach the public while also changing the speed of public opinion formation. This situation also reveals the importance of creating a common point of view between people (Yamaç, 2009).

Social media are structures designed as an environment suitable for access, can be restructured, has a broadcasting technique compatible with change, and spread through social interaction. Social media are the environments where individuals express their wishes and expectations from any product or service offered, the structures that offer them, and positive or negative thoughts about brands and products and services belonging to these brands (Köksal and Özdemir, 2013). Social media is also highly effective as an advertising medium and is indispensable for the advertising sector.

Changing and developing technology has also brought today's ttoday'sadvertising activities to different dimensions. Advertisements on social media and the Internet have created great convenience in reaching the target audience directly. The introduction of advertising on the Internet has reduced advertising costs and made it accessible to a broader audience at a lower cost. Instagram, Facebook, Twitter, and Youtube, the advertising industry, which has expanded its coverage area by integrating with social media over time, has also led to the emergence of virtual advertising through social networking networks such as facebook, Twitter, YouTube, and Instagram. Thanks to this, the purchase action has also started quickly.

Viral ads that are spread using technology and the Internet are becoming widespread as a different dimension of marketing in our country and worldwide. Nowadays, because viral ads spread rapidly from social media, they reach the masses faster with the logic of creating a "virus effect." In this study, based on social media environments, viral ads, their characteristics, advantages and disadvantages, and especially the sociological effect of viral ads through a sample viral ad analysis will be examined.

Method
The most important purpose of the content produced for promotional and marketing purposes is to increase the visibility and awareness of the brand offering the promoted service or product. For this purpose, it is important how much and to what extent the content reaches the people who want to receive services related to the area in which the service or product in question is located. The data obtained by content analysis serves to ensure that the content produced has access to a wider network of users. Content analysis, which is used to analyze a large number of content, is mostly related to the themes in that content. The importance of content analysis, which is a qualitative research method, in digital marketing has also been taken into account. The original content produced in the digital marketing process is analyzed in order to increase their success in reaching a certain audience. In the sample study, in addition to the content analysis performed via viral advertising, the compilation method was also used.

Communication Environments with Social Media: Perception and Perception
Changing and developing technology in the field of communication has caused significant changes not only in daily life but also in social, cultural and economic life. Digital technologies, new media, the Internet and social media constitute the basis of changes. The Internet, which was first created for military use, has increased its usage rate considerably after it became public. Especially while the internet, which started to become widespread in the late 1990s, offers an environment called wWeb1.0, it has reached the next level as wWeb2.0 as of 2004, and it has become possible for users to create content on the Internet. The first steps of social media have also been taken in this way.

As it is known, social media is the dialogues and exchanges that individuals make over the Internet. Facebook, Twitter, Blog pages, forums, etc., are communication environments with an increasingly growing audience today. The fact that the tools that create these environments have an extensive user base and are gradually spreading is also crucial in influencing society's behaviour. The fact that social media sharing networks can be constantly updated and are open to multiple uses has become an ideal communication tool for people.

Social media is a media system that allows two-way and simultaneous sharing of information and content. In this system, where the extent of people's communication with each other has changed, individuals can easily access all the content they are interested in with the help of social networks. The effect of perception and perception has also changed through this communication with the help of technology.

In many sources, especially the dictionary of the Turkish Language Institution, "perception" is expressed as reaching the consciousness of that thing by directing attention to something and realizing it. The Perception Process is a meaningful, systematic and direct reaction of the organism to objects and events. Perceptions arise as a result of the senses. They take shape according to their old or new information. Therefore, perception is a personality reaction (Gültekin, 2021).

People also use their sensory organs and emotions to survive. They experience a series of interactions in their brain to see, hear, feel, smell, taste, touch and briefly perceive what is happening around them. Because in order for a person to act or be directed in one direction, a person must be aware of information in a specific direction. This means that a person understands the world and perceives it (Gönenç, 2018).

Creating, reproducing and managing the message intended to be given to the target audience or society per certain goals is expressed as perception management. For the target audience to reach the intended level, the audience is first analyzed in detail. In this way, the weaknesses and strengths of the audience are revealed, and then action is taken using the media, especially social media, to reach the desired perception.

In this method, which is used especially intensively in political life, media and social media are included in the process and virtual realities are created, making the distinction between the "real" and the "fictionalized" environment challenging to understand by mixing them. Thus, the intended attitude and change can be easily reached (Göksu, 2021).

Social Media as an Advertising Tool
Social media has become the most critical influence of the visual world and an indispensable communication tool today. As it is known, communication is an essential tool for individuals to listen, judge, question and understand each other. Social media, consisting of the Internet and fast communication networks, has become a preferred area and a tool for individuals to communicate today. Social media, which offers its users a wide range of opportunities, also contains many positive and negative situations. According to Dijk (2016), social networking networks, considered social media, have emerged based on a need. Social media, seen as an alternative solution to social problems regarding content and quality, has also become an advertising medium.

According to Kırık (2017), "One of the most critical factors in the emergence of social media can be fulfilling the wishes of capital in today's world. Increasing demands also bring competition with them. Advertising is transmitting a message about a product or idea to the target audience through communication tools. It is essential to convince individuals and ensure that they take action.

As in many areas today, social media has become necessary in advertising. Because advertising is effective in the continuity of both businesses and individuals and societies, there are indispensable elements for a business or firm to continue in the same environment or sector and to maintain its hold. In today's conditions, its use in advertising and social media is among these elements. Dec. Social media confronts its consumers with new differences almost daily, increasing recognition and permanence. The importance of Twitter, Instagram, youtube and other social networking networks, especially Facebook, is very high in this recognition and is quickly becoming known to the consumer. The use of video broadcasts increases the effect even more.

The possibility of getting faster and broader information about a product or service that has just entered the market through social media causes businesses to use these networks more effectively and actively. Internet systems that develop in parallel with the rapid development of technology also affect easier access to the consumer due to the expansion of the speed of use and the area of use (Bulunmaz, 2021).

Advertising and Advertising Studies That Have Gone Viral
The Turkish French word "reclaim" from the word entered into Turkish advertising is expressed as" the publication of messages that appeal to the eye or ear through the media for a price in order to warn consumers about the existence of a product or service and to create a positive attitude towards that product, service, brand or institution" (Küçükerdogan, 2011). The primary purpose of advertising is to introduce the service or products to the buyer to make them show interest in this product and service and to generate income at specific rates through this event.

Advertisements are not made for commercial purposes only. There are also advertisements prepared for image or prestige purposes or by targeting the public interest in the form of a public spotlight. Because the best way to reach the audience and the target age groups is through advertising. Advertising is not only done by taking into account the needs of consumers. Since people's needs change over time, it is also essential to create different services and products according to the changing needs. It also describes the activities that are talked about in ads and the ideas that are generated. What is essential is that the consumer's reliability of the advertised product or service is also on the agenda. Enterprises are also forced to behave in a way that meets the requirements (Odabaşı and Oyman, 2003). Persuasion is critical in advertising. For persuasion, the advertising sector needs to have a good perception of the importance of advertising. Advertising provides product and brand information, adds value to the product and service, activates the target audience to direct sales, and supports businesses by reminding the consumer. For this reason, advertising is also essential as a sector. The history of this sector, which goes back to the ancient Roman

period, has become a significant activity and business line of today by adapting to the developing and changing times.

It is necessary to consider advertising as a whole. After the stage where topics such as the preparation editing of texts, the advertising campaign stage, economics and psychology are included, the media, i.e. the announcement stage, comes into play. As a result, there is a need for the advertising and advertising sector to increase sales, provide vehicle operation, reduce price-demand flexibility and brand dependence, provide convenience in sales to vehicle enterprises, guarantee quality, ensure the reduction of unit costs and contribute to the survival of enterprises Jul. As it is known, advertising is an area that transmits actions or messages related to a service or product verbally or visually to the targeted audience for a certain fee. Advertising, which is the promotion of a product or service to consumers using all media elements, influences attitude and behaviour change in consumers. Persuasion is an essential feature in advertising.

Social media, which has become an area where individuals share almost every moment, has brought a different dimension to advertising. The Internet and social media networks, which have become more effective on people with the development and change of technology, have also changed the understanding of advertising due to the ability of multiple users to access images, videos and messages simultaneously. Viral ads have started to be expressed more with this method. Enterprises have also adopted viral marketing by understanding these developments more accurately. Based on how word-of-mouth communication occurs on the Internet, this area is being used very effectively today.

Along with the development indicators of the Internet, websites have come to the fore. In particular, corporate websites have become an essential source of prestige for companies. One of the most important benefits of online advertising is that a product or service can be delivered anywhere in the world without physical boundaries. Viral ads, one of today's most effective techniques in social media and internet environments, quickly deliver the products and services of companies and brands to the whole world. Viral ads have come to the forefront, especially with the development of the Internet and social media and their entry into human life. Because users are unaware of the ad, the ad can very quickly circulate from hand to hand and spread like a virus.

The emergence of viral ads in the historical process has yet to be discovered. However, some sources state that this kind of advertising feature was made by "Hotmail" for the first time. Which is the user address of Hotmail "www.hotmail.com." it is stated that Un has provided a free electronic mail service to its users for the first time. Users have received a complimentary "Hotmail" account and sent emails with other users, "get your private, free email at the bottom of the sent emails www.hotmail.com "your private, free email account www.hotmail.com take it from the address" he placed the message. Many users who received the messages also logged in to the site after these emails and got an account. Naturally, Hotmail has become more and more widespread all over the world (Porter and Golan, 2006 akt. Kınık, 2017, 127). Although this viral idea that has been realized seems to be a simple method in today's conditions, when the functioning of viral ads is examined, it is seen that it is the same method. Because it becomes effective by spreading from user to user in ads that have gone viral. Just as an advertisement can stay on the agenda for a day, it can also make its impact felt for a month or even a year.

The concept of viral advertising or viral advertising appears as an extension of social media elements. It aims to create and develop brand awareness among the designated target audiences. It appears in front of the viewer or consumer in many different ways. In ads that have gone viral, it is tried to attract the target audience of the advertised product, service or idea into its story. The most effective way they benefit from doing this is to identify with a character. If the buyer identifies himself with one or more of the characters in the ads, it dramatically increases the feeling that he is taking part in that ad. The target audience that puts itself in the place of another character starts to feel that it is part of that character's experience. Studies that have gone viral also become very important regarding people's preferences or follow-ups since this emotional connection has largely been realized. Nowadays, these ads, which are watched with interest in our country and worldwide, are breaking viewing records, especially on YouTube. These videos are made through users or brands. Videos prepared by users are watched more than others. Related videos are uploaded to YouTube in particular and shared with a broad audience with the help of social networking networks such as Facebook, Twitter and Instagram.

In viral advertising, users can also shoot their videos and share them with other users on social networking sites or internet sites. Sharing such a thing is a significant advantage for millions of people. In addition, there is a distinct advantage in this type of advertising because the user ID can also send messages and watch videos without explicitly sharing them. At the same time, the inability to determine what is original and what is derivative reveals a bearish superiority. However, some situations have disadvantages. The most significant risk in viral advertising and viral marketing is the lack of control that occurs on the Internet. This deficiency can lead to negative results

of viral advertising campaigns. Especially in some derivative viral advertising videos, problems such as humiliation and humiliation of brands arise. This creates a negative brand perception in the consumer's mind, and it is almost impossible to correct this difficult situation.

The Effect of Viral Ads on Mass Education

Technological developments and the media content shared on the Internet that have emerged in the context of these developments contribute not only economically, culturally, socially or politically but also to the education of individuals and the masses. With the integration of new communication technologies into everyday life, "interaction" has accelerated within the scope of various factors in people's lives, and people's insensitivity or sensitivity to many issues has increased. This situation has caused people to show different behaviours to certain studies or developments in their daily lives. Especially insensitive people direct their current needs to different searches, search for new communication environments, or get involved in different communication environments (Zafer, 2021). The most important of these communication mediums is social media; the advertising sector uses these mediums successfully. The most effective element of today's relevant sector is viral advertising. Viral messages are randomly circulated on internet-based social networking networks and sites, so videos, messages and a wide variety of content can easily reach the target audience.

Viral ads quickly promote educational materials, institutions or projects. This helps people to discover new opportunities or resources related to education. Viral ads contribute significantly to the education of individuals or audiences both with the detailed information they provide with the size of the product and detailed information provided in terms of the institution, organization, service characteristics or qualities of the advertised brands. Viral ads are not limited to influencing consumers' behaviour and enabling them to take action towards purchasing. They also have significant contributions to community education. Addressing social problems in the name of creating awareness also causes people to become more aware of these problems, to be informed, and to be educated. Animal rights, women's or children's rights affect the mobilization of the masses by creating an atmosphere of discussion in society in the face of numerous problems.

Viral ads have the potential to reach a broad audience. This situation can make it possible for more people to hear important messages about education because technological developments contribute to the rapid reach of all kinds of media content shared on the Internet to a vast audience. With the Internet, the great masses have taken control of the production and distribution of information under their control. All kinds of information is reached by communicating with the masses. Considering the Internet is a fast communication network, the proportion of individuals reached by spreading quickly in viral ads is too large to calculate. A big reason why it is addressed to a broad audience is that it also has the feature of being constantly up-to-date. Rather than individuals exchanging information directly with each other, the fact that people can have information in many different areas on social media or interact in these areas and accessible communication also affects the breadth of the audience.

Creative and exciting ads related to education attract people's attention and can create incentives for them to focus more on educational issues. In viral ads, it is more important not what the message says but how it is said. For the viewer to be affected by the viral ads, nonverbal communication and convincing, engaging conversations are included. In addition, eye contact, speech speed and body language are important, especially in videos. In addition, entertainment and information are also essential for viral ads. October 20, 2019. The music to be used or the venue to be chosen is effective in terms of attracting interest.

Viral ads can be an effective tool for educational campaigns or awareness-raising efforts. For example, it can draw attention to significant educational problems or create awareness. However, the content must be correctly informative and educational for viral ads to contribute to education.

Viral ads, which have the power to affect the masses intensely, have the potential to affect the target audience and the consumer more when they are prepared in a style that speaks to emotions. A large number of elements are included, including the element of violence. In order to understand and make sense of the target audience by analyzing viral ads correctly, the most searched words and words are identified and often used by users. There is no explicit advertising in a viral ad. However, the subject, not the brand, is more in the foreground and directly addresses people's subconscious. Therefore, awareness raising is significant.

Ice Bucket Challenge Advertising Example

This campaign, which became famous with its full name in English under the name "Ice Bucket Challenge", that is, "Ice Water Challenge", and quickly spread with the support of celebrities and opinion leaders, is not a direct advertising campaign. However, it has grown like an avalanche with the social media influence created by celebrities and opinion leaders and managed to go viral in 2014 and pioneered such movements. The purpose of

this campaign is to draw attention to the ALS disease, to make people aware of this disease, and even to raise public awareness by making people who participate in the campaign feel what people with the disease feel. The main goal was to raise some awareness and collect donations to associations established to combat the disease.

Charles Kennedy, a golf player, first started the campaign. This startup took action without being connected to an institution and experienced a leap with the interaction of Charles Kennedy with this formation in order to attract attention. Charles Kennedy started by making videos and tagging his wife and one of his friends, Pete Frates. Pete Frates is an American baseball player diagnosed with ALS disease in 2012 at 27 and had to end his sports life due to this disease at the age of 31. Starting this campaign was an irrevocable idea that got in the way and became current when Charles Kennedy, an old friend of Pete Frates, invited him. Because he is also well-known, he wanted to make this kind of campaign current in 2014 by spreading it to celebrities and people around them. In this campaign, which is based on the ice water technique used by athletes specifically to relax or stimulate their muscles, Pete Frates poured a bucket full of ice water from the head down to show people how ALS patients feel about this disease and at the same time wanted everyone to experience it in November in a fun way.

The first person Pate Frates invited to this campaign was his close friend Corey Griffin. With this method, Corey Griffin convinced his entourage to participate in this campaign and ensured its rapid spread. It should be especially noted that this campaign is not an agency campaign. Individuals themselves have made such videos to make it current. The biggest reason the campaign has gone viral is that individuals feel the same feelings more sincerely by observing that other people they know are doing it. They want to be involved themselves by not being indifferent to it. In this context, the campaign has grown like an avalanche and has managed to reach all the celebrity followers on social media, especially with all the "challenges" and invitations made among celebrities. Dec.

Conclusion and Recommendations

Unlike traditional media, new media, which has become a part of human life, is an environment based on sharing various topics with a broad audience, commenting, discussing and interacting with similar content through Internet technologies. The visual aspect shared in this environment, the powerful content aspect, and the rich advertisements have become indispensable communication areas for institutions, individuals, and, therefore, the masses. Especially in the advertising sector, the birth of viral ads, which have become influential in sales and strategies, has been achieved.

Nowadays, since the promotion or sale of products or services is carried out over the Internet, the flow and distribution of information have passed chiefly to the control of the consumer since direct communication with consumers serves the purpose of spreading the product or service. Ads that spread and go viral on the Internet through social networking networks have essential contributions from an economic, cultural, psychological and sociological point of view. It has become highly successful in reaching a broad audience, raising awareness and especially forming awareness. Viral ads, which have a wide variety of content and visuals, also have a very influential position on society in terms of mass education.

As can be seen from the example of viral advertising analyzed, it has been highly successful in community education and mobilizing the masses by using celebrities and opinion leaders in the context of social responsibility. Nowadays, when the Internet and social media platforms are used intensively, the interest and skill of individuals and the audience in distributing information and information will continue to rise to an even higher level with the contribution of technology.

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Application of Eri Silk to Create Awareness of Undergraduate Students

Chinnawat JUNSAWAT
Learning Technology and Innovation Division, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi, Pathum Thani, 12110, Thailand
chinnawat_j@mail.rmutt.ac.th
ORCID: 0009-0000-2015-9498

Thosporn SANGSAWANG*(*Corresponding author*)
Educational Technology and Communications Division, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi, Pathum Thani, 12110, Thailand
sthosporn@rmutt.ac.th
ORCID:0000-0002-7926-6949

ABSTRACT
The objectives of this study were to 1) investigate the efficiency of Application on Eri Silk to create awareness of Undergraduate students, 2) compare students' achievements before and after learning through Application on Eri Silk to create awareness of Undergraduate students, and 3) examine student satisfaction towards the Application on Eri Silk for creates awareness of Undergraduate students. The sample comprised 30 First-year undergraduate students at Rajamangala University of Technology Thanyaburi, 30 people, using the Purposive Sampling method. The instruments used for collecting the data were an Application on Eri Silk to create awareness of Undergraduate students, a pretest and a post-test, and a student satisfaction form. The data analysis statistics were percentage, mean, standard deviation, and t-test for the dependent sample. The research findings revealed that the Application of Eri Silk for creating awareness among Undergraduate students was adequate according to E1/E2 at 82.40/81.33. The student's achievements after learning through the Application of Eri Silk for creating awareness among Undergraduate students were higher than before learning. The mean and standard deviation before learning were 8.80 and 2.33, while the mean and standard deviation after Education were 16.33 and 1.48. The t-test score used before and after schooling was 20.68 at a statistically significance level of .05. Moreover, the student satisfaction towards the Application of Eri Silk to create awareness among Undergraduate students was at a high level,
Keyword: Application on Eri Silk, Creates Awareness, Undergraduate students

INTRODUCTION
The research explores the educational benefits of using Eri Silk as a focal point for awareness and learning among undergraduate students. Eri Silk is a unique and durable fiber produced in various Asian countries. It holds immense cultural, economic, and environmental significance. The purpose of this study is to investigate the effects of adding Eri Silk into the educational curriculum to determine whether it is successful in raising students' understanding of the steps involved in the production of silk, its cultural significance, and its contribution to environmentally responsible practices. This investigation attempts to improve students' comprehension of traditional handicrafts, cultural heritage, and ecologically accountable textile production by incorporating experiential learning and interaction methodologies.

Eri Silk, also called Samia Cynthia in the scientific community, is a distinctive and environmentally sustainable form of silk indigenous to several Asian nations, most notably India, Thailand, and some regions of China. This section provides a complete introduction to Eri Silk by elaborating on its relevance in history, culture, and the economy. The manufacture of Eri Silk can boast an illustrious history that dates back centuries. For centuries, members of indigenous communities in areas such as Assam, India, have engaged in sericulture, also known as cultivating insects, that produce silk. The craft of weaving with Eri Silk and the traditions that have grown up around it have always been an essential part of these communities' cultural fabric, helping to form their identities and ways of conducting business: sericulture and Silk-Making Process. Eri Silk is unique among silk varieties due to its humane and sustainable production process. Unlike traditional sericulture, which often involves boiling silk-producing larvae, Eri Silk is harvested after the moth emerges from its cocoon. Producing Eri Silk involves rearing the Eri Silkworms on specific host plants, usually castor leaves, until they spin their cocoons. Silk production is a delicate process that requires ethical practices. To allow the insects' life cycle to continue, cocoons are collected and then boiled in hot water to soften the sericin, the protein that holds the silk threads together. The softened sericin is spun into yarn, resulting in a distinctive, soft, and lustrous silk fiber-the natural colors of silk range from creamy white to shades of brown. Lepidopteran larvae secrete silk to form feeding tubes and cocoons for protection. According to recent studies, Bombycid and pyramid moth silk comprise multiple abundant silk

components with outstanding mechanical capabilities.

Discover the main silk components in most species. We found over 100 silk cocoon secretory proteins using de novo transcriptome sequencing. Fibrin, protease inhibitors, and new silk components were the most abundant proteins. Silk protein expression and gland and morphological research by tissue and developmental stage (Rouhova et al., P., & Zurovec, M., 2021).

Eri Silk carries with it a profound cultural history in the regions in which it is produced. It is used to weave the Mekhela Chador, which is traditional attire in Assam, as well as a variety of other textiles in Thailand and China. Weaving with Eri Silk is an ancient tradition that helps keep cultural pride and continuity alive. Fabrics made of Eri Silk frequently take their design cues from the surrounding natural world or local culture. A manifestation of the strong connection that exists between the craft and the natural environment in which it is located. Items made from Eri Silk have a value that is distinct not only aesthetically but also narratively because of its cultural integration. In addition to its cultural value, the production of Eri Silk has a substantial impact on the economic well-being of a great number of individuals. Sericulture, which comprises farming Eri Silk and weaving it, is a lucrative industry that provides a living for a significant number of people. This is particularly the case in more remote locations, where there are less chances for finding work. The Eri Silk business has grown because of the increased demand for environmentally clean and socially responsible textiles all over the world. The natural features of this material and a manufacturing process that is favorable to the environment contribute to the popularity of using it in the garment and textile sectors. Understanding the multiple components that make up the nature of the material is necessary to investigate the instructional potential of Eri Silk. Through the incorporation of Eri Silk into educational programs, the purpose of this research is to impart knowledge to undergraduate students on the one-of-a-kind variety of silk known as Eri, the cultural value of the material, and its role in the development of ecologically responsible textile techniques (Leem, J., Fraser, M., & Kim, Y., (2020).

Silk is one of the earliest known textiles and has been essential to many different cultures for hundreds of years. Eri Silk stands out among the many kinds of silk due to its exceptional qualities and environmentally friendly manufacturing process. Through this application, we intend to familiarize undergraduate students with the world of Eri Silk to encourage a knowledge of this material's ecological relevance, economic potential, and cultural significance. Please provide a full review of Eri Silk, focusing mainly on its history, manufacturing method, and distinguishing qualities. It is essential to bring attention to the fact that Eri Silk is obtained from the Eri Silkworm, which, in contrast to the classic Bombyx mori silkworm, is not associated with the mulberry plant and may be raised on various host plants. A manifestation of the strong connection that exists between the craft and the natural environment in which it is located. Items made from Eri Silk have a value that is distinct not only aesthetically but also narratively because of its cultural integration. In addition to its cultural value, the production of Eri Silk has a substantial impact on the economic well-being of a great number of individuals. Sericulture, which comprises farming Eri Silk and weaving it, is a lucrative industry that provides a living for a significant number of people. This is particularly the case in more remote locations, where there are less chances for finding work. The Eri Silk business has grown because of the increased demand for environmentally clean and socially responsible textiles all over the world. The widespread use of this material as a garment and textile component can be attributed, in part, to the inherent qualities of the material itself as well as to the production method, which is kind to the natural world. To study the pedagogical potential of Eri Silk, it is vital to have a comprehensive understanding of the various components that comprise the nature of the material. Using Eri Silk in educational programs, the goal of this research is to educate undergraduate students about the one-of-a-kind variety of silk known as Eri, the cultural value of the material, and its role in the development of environmentally responsible textile techniques. Eri Silk had comparable strength despite having low crystallinity (29.2%). This is an indication that on optimizing rearing procedures and practices of Eri Silkworms to certain regions of Kenyan environment, better quality silk fibers can be produced that are competitive in the world market (Oduor, E., Ciera, L., Adolkar, V., & Pido, O., 2021).

Discuss the opportunity it presents for the generating of income and the maintenance of sustainable livelihoods. Put on display successful case studies or businesses that have flourished because of the manufacture of Eri Silk. Integration into the Academic Curriculum: Suggest including studies of Eri Silk in appropriate classes that are part of the undergraduate curriculum. The study of textiles, environmentally friendly fashion, cultural anthropology, or even business could fall into this category. Outline relevant curriculum, hands-on projects, or field visits that students could participate in to deepen their understanding of Eri Silk. Workshops & Hands-On Activities: Suggest scheduling workshops and hands-on activities to provide students with practical experience dealing with Eri Silk. This could involve dying the cloth, weaving it, or creating designs. To create a more in-depth educational experience for students, encourage them to work together with local artists or organizations. Awareness Campaigns and exhibits: Propose organizing awareness campaigns or exhibitions to showcase the benefits and possibilities of Eri Silk. Students get the opportunity to share their expertise with members of the community at large and bring

attention to the importance of selecting environmentally responsible clothing at these events. Not only does educating undergraduate students about the world of Eri Silk increase their knowledge of textiles, but it also instills in them a sense of responsibility towards more environmentally friendly techniques. Students can become advocates for sustainable fashion and contributors to the preservation of cultural heritage and ecological balance when studies of Eri Silk are included in the curriculum, and students are provided with hands-on experiences. Using this application, we aim to equip the future generation with the information and skills necessary to engage

The Current Situation begins an investigation into the educational possibilities inherent in Eri Silk, a one-of-a-kind and environmentally responsible form of silk from several Asian countries, including India, Thailand, and some sections of China. This article is the first in a series to investigate the educational possibilities inherent in Eri Silk. This investigation will evaluate the academic potential that is inherent in Eri Silk and then offer the conclusions of that investigation. The objective of this investigation is to present the findings of that investigation. This chapter establishes the foundation for the rest of the research by illuminating the significance of Eri Silk from a historical, cultural, and economic point of view, respectively. In addition, it studies the use of Eri Silk as a practicable teaching aid with a high level of effectiveness. Eri Silk is a particular strain recognized for its ethical and environmentally responsible production manner. In the scientific community, Eri Silk is also known as Samia Cynthia. This conversation is going to center on Eri Silk.

In contrast to the conventional techniques of manufacturing silk, which usually involve boiling silk-producing larvae as an integral part of the process, the harvesting of Eri Silk occurs after the moth has emerged from its cocoon. This humane technique makes it possible for the insect's life cycle to continue, which in turn helps manufacture the fiber in a morally responsible way. Culturing Eri Silkworms on host plants, most often castor leaves, is the first step in producing Eri Silk. The conventional techniques of manufacturing silk, which usually involve the boiling of silk-producing larvae as an integral part of the process, the harvesting of Eri Silk takes place after the moth has emerged from its cocoon. This humane technique makes it possible for the insect's life cycle to continue, which in turn helps manufacture the fiber in a morally responsible way. Culturing Eri Silkworms on host plants, most often castor leaves, is the first step in producing Eri Silk. Many lepidopteran larvae secrete silk to form feeding tubes and cocoons for protection. Recent research on Bombycid and pyralid moth silk has shown numerous prevalent silk components with outstanding mechanical characteristics. It also contains other proteins with unknown roles. We investigated the cocoon proteins of Tineola bisselliella, a base ditrysian moth, to understand the silk composition of primitive lepidopteran species and identify the critical silk components seen in most species. We found over 100 silk cocoon secretory proteins using de novo transcriptome sequencing and MS-based proteomics. The most prevalent proteins were the Fibroin, sericins, protease inhibitors, and numerous new silk components. We confirmed the tissue and developmental stage specificity of silk protein expression and described T. bisselliella's silk glands and silk morphology. We analyze silk in the primordial moth, broaden the number of silk-specific genes in Lepidoptera, and explain their evolutionary links (Rouhova et al., P., & Zurovec, M., 2021).

This stage lasts until the silkworms spin their cocoons, at which point the process is complete. After the cocoons have been collected, they are cooked in boiling water to soften the sericin, a protein responsible for binding the silk threads together. Once the sericin has been muted, the cocoons are spun into yarn. The finished product of this method is a unique variety of silk fiber that is milky white in color, glossy, and very gentle. In addition, it comes in various natural colors, ranging from dark brown to creamy white-the Importance of Eri Silk to Both Culture and the Economy. Eri Silk has a significant cultural and economic impact on the parts of the world where it is produced. These regions are known as Eri Silk-producing regions. It is woven into traditional clothes for reasons concerning the culture. One example of this is the Mekhela Chador, which is worn in Assam, India. It is also woven into other textiles in Thailand and some parts of China. The practice of weaving with Eri Silk is often a cherished family tradition that is passed down from one generation to the next. The production of Eri Silk through sericulture not only helps preserve cultural heritage and promote cultural identity but also serves as a crucial source of livelihood for many people, particularly those living in rural areas with limited employment opportunities. The economic sector of sericulture, which involves cultivating Eri Silk and weaving it, plays a vital role in sustaining the subsistence of many people. This is especially true in rural areas with limited employment opportunities in other fields. The rising global demand for textiles that are produced in an environmentally friendly and ethical manner has given Eri Silk an additional boost to its economic significance. This need is a direct result of the globalization of the textile industry. This material is desirable in the garment and textile industries due to its natural features and environmentally friendly manufacturing process. The Educational Possibilities of Eri Silk present a compelling possibility for educational integration because of the complex historical, cultural, and economic tapestry that it embodies. This study intends to take advantage of the unique characteristics of Eri Silk by incorporating it into educational programs in the hopes of increasing students' levels of engagement as well as their level of knowledge. Students get the opportunity to delve into the world of Eri Silk through practical learning and interactive

approaches, obtaining insights into the production process of Eri Silk and its cultural resonance and contributions to sustainable textile practices. Eri Silk has been around for thousands of years and has a rich history. The audience for this integration is undergraduate students, and the objectives are to inculcate in them a respect for traditional craftsmanship, cultivate cultural awareness, and promote ecological sustainability.

LITERATURE REVIEW
Using Eri Silk to foster awareness among undergraduate students signifies an innovative strategy in textile education and sustainable practices. This literature review examines current research and pertinent literature concerning Eri Silk comprehensively. This study will explore the ecological relevance and cultural importance of Eri Silk and its potential as an educational resource for undergraduate students. Researchers will discuss Eri Silk, known as "peace silk" or "ahimsa silk." This unique type of silk is obtained from the domesticated Eri Silkworm, which is scientifically known. It is native to India, specifically the Northeastern regions, and is well-known for its luxurious texture, thermal properties, and versatility.

In contrast to traditional silk manufacturing methods, extracting Eri Silk does not necessitate the termination of the silkworm's life, hence adhering to ethical and environmental principles. The research findings indicate that Eri Silk production exhibits a notably reduced ecological footprint compared to conventional silk manufacturing. This phenomenon can be ascribed to the fact that Eri Silkworms can consume diverse host plants, mitigating the necessity for extensive monoculture agricultural practices. Furthermore, extracting Eri Silk does not necessitate the use of detrimental chemicals, thereby rendering it a more environmentally sustainable option. The cultural significance and traditions of Eri Silk possess significant cultural importance in Northeastern India, where it has been an integral component of the cultural history of indigenous populations for multiple centuries. The incorporation of this fabric into customary garments, its utilization in ceremonial settings, and its significant contribution to the local economies are notable aspects. Understanding these cultural connections might give pupils a more comprehensive societal framework. Various studies have indicated that producing Eri Silk can enhance rural economies by providing sustainable livelihood opportunities. The decentralized character of sericulture enables small-scale farmers and craftspeople to participate in silk production, hence facilitating poverty reduction and economic empowerment at the local level. Incorporating Eri Silk into academic curricula for textile and fashion education provides a promising economic integration opportunity. While conventional silk manufacturing is commonly addressed in these curricula, including Eri Silk, which has received less attention, holds significant educational value. Including Eri Silk studies in undergraduate curricula presents students with a distinctive academic prospect of acquiring knowledge regarding sustainable alternatives and actively participating in ethical fashion practices. The utilization of hands-on learning and workshops Engaging in practical activities such as dyeing, weaving, and designing with Eri Silk fabric can significantly augment students' comprehension and admiration for this environmentally friendly material. The provision of workshops facilitated by seasoned practitioners promotes a more profound engagement with the realm of Eri Silk. Awareness campaigns and exhibitions can help spread Eri Silk's knowledge among academics and the public. These initiatives allow students to share knowledge and promote sustainable textiles since youngsters learned by seeing their elders, and silk weaving artisans' families had no formal schooling system. Discipline, modeling, and example behavior aid entrepreneurial Education. This method preserves silk weaving culture. This work has theoretical and practical implications. This study fills research gaps to address academic concerns. Practical implications include the expectation that industrial decision-makers can preserve silk weaving's cultural value (Inanna et al., 2020).

Eri Silk has emerged as a significant milestone in environmentally friendly textile production. Also known as "peace silk" or "ahimsa silk," it is made from the domesticated Eri Silkworm and is a versatile fabric. This traditional fabric offers various benefits and advantages of adopting an eco-friendly alternative to conventional silk manufacturing. This article explores the implementation of sustainable sericulture practices and examines their environmental and social impacts. The cultivation of Eri Silk represents a deviation from the traditional methods used in the sericulture industry. Unlike the Bombyx mori silkworm, the Eri Silkworm can ingest various host plants, making it a more ecologically sustainable alternative.

Furthermore, the process of harvesting Eri Silk is carried out to ensure the well-being and survival of the silkworm, aligning with ethical guidelines and advocating for policies that prioritize the avoidance of cruelty. Using the Eri Silk manufacturing process demonstrates a notable capacity to successfully alleviate the environmental ramifications frequently linked to traditional methods of silk production. Eri Silk farming is beneficial for preserving biodiversity and mitigating monoculture farming practices because of its ability to thrive on many host plants and its minimal dependence on chemical inputs. In general, silkworm oil is a highly concentrated reservoir of functional lipids and tocochromanols. The Practical Applications of a Concept This study aims to comprehensively examine the primary lipid classes and tocochromanols found in the pupae of Antheraea pernyi. The available data provides corroborating evidence for the extensive application of silkworm oil in creating

nutritionally beneficial and health-promoting goods. The informative data support the comprehensive utilization of silkworm oil to produce nutritional and healthy products (Wang et al.; S., 2020).

Cultural Significance & Artisanal Heritage: Eri Silk has profound cultural roots, particularly in the Northeastern parts of India, where it has been woven into the fabric of local customs for generations. In addition, Eri Silk has a rich heritage of artisanal production. Awareness and appreciation of this legacy contribute to expanding our cultural knowledge, and it also helps ensure the financial security of craftspeople who have polished their abilities in making silk products. Recent Developments in the Textile Industry: The textile industry has been on the cutting edge of innovation thanks to the malleability and plasticity of Eri Silk. Artisans and designers are experimenting with new creative uses in various industries, from fashion and accessories to furniture. Because of its one-of-a-kind texture and welcoming warmth, the fabric is in high demand as a material for eco-friendly manner and interior design. Economic Empowerment and Rural Development The decentralized nature of sericulture for Eri Silk gives opportunity for small-scale farmers and artisans, particularly in poor regions. By producing Eri Silk, communities can lessen their reliance on agricultural practices that are less reliable and so increase their chances of finding economically viable pathways for economic empowerment. Educational Possibilities The incorporation of the study of Eri Silk into academic courses provides students with a learning experience that is both singular and invaluable. Students gain a more profound respect for ethical fashion methods and better understand the sustainable alternatives in the textile industry. Growing Availability and Awareness of Eri Silk Products Contribute to the Growth of a Conscious Consumer Market Eri Silk products are becoming more widely available, contributing to the Growth of a conscious consumer market. The demand for Eri Silk keeps rising, encouraging positive change in the broader textile sector. Consumers are more interested in purchasing products that are created responsibly and ethically. The introduction of Eri Silk represents a significant step toward a method of textile production that is more environmentally friendly and socially responsible. Adopting this time-honored yet forward-thinking fabric helps the environment and preserves cultural heritage, gives local communities more influence, and fosters a more accountable consumer market. Eri Silk is a leading example of good transformation in the textile sector, which is becoming increasingly important as the global society becomes more aware of the need for environmentally responsible business practices. The Kenyan Eri Silk used for this study was characterized by determining its sericin concentration, moisture content, surface morphology, thermal properties, functional groups, crystallinity, and single-fiber tensile strength, among other things. According to the study's findings, the physical characteristics of Kenyan Eri Silk are comparable to those of silk produced in other nations with a substantial commercial presence. Kenyan Eri Silk displayed an equal degummed tensile strength of 6.81cN while having a low crystallinity of 29.2%. This finding lends credence to the hypothesis that it is possible to produce silk fibers of a higher grade that can effectively compete on the international market by enhancing the rearing procedures and practices of Eri Silkworms in certain portions of the environment in Kenya. (Oduor, E., Ciera, L., Adolkar, V., & Pido, O., 2021).

METHODS
Population and sample group:
The population of high school pupils at Dipangkornwittayapat (Mattayom et al.) The school served as the subject of this investigation. The total number of students: 369 individuals and the students of Secondary 4 at Dipangkornwittayapat (Mattayom et al.) Under the jurisdiction of the Pathumthani Secondary Educational Service Area Office, the school served as the sample group for this research. There was one classroom with a total of 30 students. The academic year was 2022. Because the room in question will be used for a class on rice during the second semester of the academic year 2022, this information was collected by picking a specific sample, also known as "Purposive Sampling."

Instruments of Research:
(1) Application on Eri Silk to create awareness of Undergraduate students, seeking the opinions of industry professionals evaluating the quality of Application on Eri Silk to create awareness. (3) The pretest and the subsequent test., and (4) An evaluation form for Undergraduate students regarding using the Application on Eri Silk to create awareness.

Data collection:
Collecting data includes researching many concepts, fundamentals, and theories associated with producing augmented reality media. The increased reality material that the researchers generated should be brought to the professionals so that they can review it. To ensure consistency in the content, language, questions, teaching activities, and the overall aim of the creation, consultation with measurement and evaluation specialists is crucial. Their recommendations should be considered to make necessary improvements and corrections, ensuring accuracy and comprehensiveness. After this, the augmented reality media was used three times with students from schools not included in the sample group. The effectiveness of the students was measured individually to evaluate the tool's success. After conducting an efficiency trial with small groups and field testing, the team adjusted and changes

until the product reached an acceptable level of performance. As a result, media based on augmented reality was utilized with the sample population.

Statistics used to analyze data:
(1) Determine whether using augmented reality media for marketing Thai rice products at the upper secondary level (grades 10–12) is effective. By applying the equation for calculating efficiency E1/E2 (2), Compare the pretest results with the post-test using a t-test for dependent samples with a significance level of .05 3. Using the mean and standard deviation (SD), investigate the level of contentment felt by children in Grade 4 who have access to augmented reality media.

FINDINGS
Table 1: This study presents a comprehensive summary of the findings about the efficacy of an application designed to raise knowledge about the conservation of the Eri Silkworm species, specifically about the processing of products derived from Eri Silk, for students in their inaugural year of undergraduate studies.

List	Full score	Average score	percentage	Benchmark	E1/ E2
Score during study	50	41.20	82.40	80	82.40
Posttest	20	16.27	81.33	80	81.33

Table 1 This study demonstrates the utilization of an application to raise awareness about the conservation of the Eri Silk breed, specifically about processing items derived from Eri Silk. In the context of first-year undergraduate students, an examination was conducted to assess their understanding of the conservation of the Eri Silk breed, and the processing of products derived from it. The test scores of 30 first-year undergraduate students were collected and analyzed. The average percentage score obtained in the pretest was found to be 82.40, while the average percentage score in the post-test was determined to be 81.33. These results indicate that the application of the educational program effectively enhances students' awareness of Eri Silk breed conservation and the processing of Eri Silk products. According to the above criteria, first-year undergraduate students demonstrate an efficiency rate of 80/80, specifically E1/E2 is 82.40/81.33, satisfying the stated assumptions.

Table 2. This study aims to compare students' academic performance before and after participating in a study program at the institution. This proposal seeks to develop an application to raise awareness about the conservation of the Eri Silk breed, explicitly focusing on the many processes involved in producing Eri Silk goods. For students in their inaugural year of undergraduate studies

	Full score	Average score	SD.	t	Sig.(2-tailed)
Pretest	20	8.80	2.33	20.68	.00
Posttest	20	16.27	1.48		

The findings of employing the application to raise awareness about the preservation of the Eri Silk breed and the production of Eri Silk items. For the pretest assessment of first-year undergraduate students. After the students received instruction through an application to promote awareness of the conservation of Eri Silk, the mean score attained was 8.80, with a corresponding standard deviation of 2.33. The subject matter of the instruction pertained to the processing of products derived from Eri Silk. First-year undergraduate students are then required to take a post-test. It has been shown that students tend to have more excellent grade point averages. The mean score was 16.27, with a standard deviation (SD) 1.48. A t-test analysis was conducted to compare the measurements taken before and after the study. The resulting t-value was 20.68, indicating a statistically significant difference between the two sets of measurements at the 0.05 significance level.

Table 3. The findings from the assessment of the satisfaction level among first-year undergraduate students on using an application aimed at raising knowledge about Eri Silk conservation, explicitly focusing on the processing of Eri Silk goods for this group of students.

Evaluation list	$\bar{x}$	SD.	Interpret results
1. Media			
1.1 Clear explanation of media usage	4.57	.63	The most
1.2 Beautiful and interesting media format	4.53	.68	The most

1.3	Easy to use and easy to learn	4.47	.82	A lot
1.4	The media is appropriate for use in learning	4.53	.73	The most
	Total average	**4.53**	**.71**	**The most**
2. Content				
2.1	The content meets the learning objectives	4.67	.48	The most
2.2	The language used in the lessons is easy to understand	4.47	.51	A lot
2.3	Presentation of content is easy to understand	4.57	.50	The most
2.4	The amount of content in each story is appropriate	4.40	.72	A lot
2.5	The content arrangement and teaching steps are easy to understand	4.30	.70	A lot
	Total average	**4.48**	**.60**	**A lot**
3. Measurement and evaluation				
3.1	Clarity of questions and answers	4.67	.48	The most
3.2	Appropriateness of the number of assessments	4.50	.68	A lot
3.3	Alignment of assessments with content	4.53	.63	The most
	Total average	**4.57**	**.60**	**The most**
4. Instructional activity organization				
4.1	Encouraging learner engagement in activities	4.30	.65	A lot
4.2	Facilitating learning anywhere, anytime	4.70	.53	The most
4.3	Promoting self-directed learning	4.40	.72	A lot
	Total average	**4.47**	**.66**	A lot
	Total average	**4.51**	**.64**	**A lot**

According to Table 3, This study aims to assess the level of satisfaction among first-year undergraduate students regarding their participation in an application designed to raise awareness about Eri Silk conservation. Specifically, the focus of the application was on the processing of products derived from Eri Silk. A total of 30 first-year undergraduate students were involved in this study. In general, there exists a notable degree of contentment. The study findings indicate an average rating of 4.51, reflecting a high satisfaction level among participants in facilitating student learning across various locations and timeframes. The study observed a sample of first-year undergraduate students, finding a mean satisfaction score of 4.70 with a standard deviation of 0.64. However, no specific items were identified as the least satisfying for these students.

CONCLUSIONS AND EVALUATION
Within the realm of research focused on creating an application that promotes awareness regarding the protection of the Eri Silk species, the topic of interest pertains to processing products derived from Eri Silk. For first-year undergraduate students enrolled at Rajamangala University of Technology Thanyaburi, the primary research aims of this study are as follows: 1) to develop an application to raise awareness about the need to conserve the Eri Silk breed, specifically about the processing of Eri Silk products. For first-year undergraduate students enrolled at Rajamangala University of Technology Thanyaburi, 2) this study aims to examine students' academic performance in their first year of undergraduate studies. There is a statistically significant improvement in learning progress at the alpha level of .05. 3) To investigate the degree of satisfaction among undergraduate students. The initial cohort of undergraduate students expresses a notable degree of contentment over implementing an initiative to raise awareness about the protection of the Eri Silk breed, specifically about the processing of Eri Silk goods. At an elevated level, the study participants comprised individuals enrolled as first-year undergraduate students in the Faculty of Industrial Education. The sample for this study consisted of 30 individuals recruited using a purposive sampling method. These individuals were affiliated with the Educational Technology and Communication Department at Rajamangala University of Technology Thanyaburi. The instruments employed in the study encompass: This proposal aims to develop an application that will effectively raise awareness about the importance of conserving the Eri Silk breed, explicitly focusing on processing products derived from Eri Silk. This study aims to gather expert opinions on the efficacy of building an application to promote knowledge of the conservation of the Eri Silk species, specifically about processing products derived from Eri Silk. The target population for this questionnaire consists of first-year undergraduate students. The present study aims to develop a satisfaction assessment form for first-year undergraduate students about utilizing a mobile application to foster awareness for preserving the Eri Silk species and its subsequent processing into various goods. For students in their inaugural year of undergraduate studies, using pre-study and post-study examinations is a common practice in academic research. They use a mobile application to generate awareness about preserving the Eri Silk species, specifically processing Eri Silk goods. First-year undergraduate students can succinctly communicate research findings and

engage in discussions about the results. The following are recommendations for further research. Methods of Research. The researcher has conducted this study. This section will examine the fundamental concepts, principles, and theories associated with developing an application to promote awareness of the conservation of the Eri Silk species, specifically about processing products derived from Eri Silk. For students in their inaugural year of undergraduate studies. The data survey results are utilized to analyze the salient aspects of the problems and ascertain their underlying causes. Identify the primary goals of the research. Developing an instructional framework via an application to foster knowledge on the conservation of Eri Silk, explicitly focusing on the manufacturing of Eri Silk goods. For first-year undergraduate students enrolled at Rajamangala University of Technology Thanyaburi. By the prescribed content framework, develop an application. Design the examination and satisfaction evaluation questionnaire for first-year undergraduate students about implementing a campaign to raise awareness about the conservation of Eri Silk, explicitly focusing on the processing of Eri Silk goods.

The researcher should submit the application they have developed to specialists in the field for review. It is essential to engage three measurement and evaluation experts to ensure that the content, language, questions, teaching activities, and objectives of the tools are coherent. These experts will be responsible for enhancing and rectifying any inaccuracies and deficiencies to ensure that the materials are precise and comprehensive as required. As experts recommend, it is advisable to consider an extensive range of factors. The topic is discussed. Utilize the application to illustrate its usage among university students beyond the scope of the provided sample group. To assess the efficacy of the application, it is necessary to identify and rectify any errors or deficiencies until the efficiency level reaches an acceptable standard.

In this section, we will discuss topic. The application will illustrate the methodology by employing a sample group comprising 30 first-year undergraduate students from Rajamangala University of Technology Thanyaburi. This will enable the determination of the program's efficiency by calculating the E1/E2 values. The value is intended to be equivalent to 80 divided by 80. Calculate the standard deviation utilizing the formula for standard deviation (SD). Examine the academic performance of students who engage in the application-based approach to raise awareness on the conservation of the Eri Silk breed, explicitly focusing on processing products derived from Eri Silk. For first-year undergraduate students enrolled at Rajamangala University of Technology Thanyaburi, in this analysis, we will conduct a comparison between the use of the mean ($\bar{x}$) and the t-test. This section provides a concise overview of the findings obtained from the conducted research. When examining the historical data. The researcher has summarized the research findings based on the predetermined objectives. The efficacy of the application in promoting knowledge about the protection of the Eri Silk species in the processing of Eri Silk goods. The efficiency of first-year undergraduate students at the Rajamangala University of Technology Thanyaburi, as measured by the 80/80 criteria, indicates that the percentage score during the study is 82.40 (E1) and the percentage score from the post-test is 81.33 (E2).

Findings from the Comparison of pre-learning and post-learning accomplishment. The study revealed a significant improvement in scores following the utilization of an educational application aimed at promoting awareness of the conservation of the Eri Silk breed. Specifically, the application focused on providing knowledge and understanding of the many processes involved in producing products from Eri Silk. For first-year undergraduate students enrolled at the Rajamangala University of Technology Thanyaburi, the score post-study exhibits an increase in Comparison to the initial score. The results were statistically significant at the significance level of .05.

The findings from the investigation on the satisfaction levels of a selected cohort of first-year undergraduate students indicate a significant degree of contentment. This section will delve into a comprehensive analysis and interpretation of the results. This study focuses on developing a mobile application to raise knowledge about protecting the Eri Silk species and the processing techniques for creating items from Eri Silk. According to the research objectives and assumptions, this study focuses on first-year undergraduate students at the Rajamangala University of Technology Thanyaburi. The research findings can be analyzed and interpreted in the following manner. In this section, we will discuss Utilizing a mobile application as an instructional tool fosters knowledge and understanding regarding preserving Eri Silk, explicitly focusing on the procedures involved in processing various Eri Silk products. For first-year undergraduate students enrolled at Rajamangala University of Technology Thanyaburi, the curriculum encompasses a range of significant educational endeavors, which can be categorized as follows: The incorporation of visual media in academic instruction about the Mongkol Lotus holds considerable value in fostering coherence between the lesson material and the learning process. Including comprehension of program usage and incorporating learning activities at each stage may provide challenges in the students' learning activities, potentially significantly impacting the learning process. The organization of learning needs to align with the objectives of structuring knowledge through media. Due to this rationale, the instructor suggested that students utilize the application initially to enhance their preparedness for engaging in learning activities via the Sangji

application. This study aims to enhance knowledge regarding the conservation of Eri Silk by examining the processing techniques employed in producing Eri Silk goods. For first-year undergraduate students enrolled at Rajamangala University of Technology Thanyaburi, to achieve an efficiency level of 80.80 based on the specified criteria, it is necessary to implement KW-CAI. The research findings indicate that students who engage in the application-based learning approach exhibit increased awareness of the conservation of the Eri Silk breed, specifically about processing items derived from Eri Silk. Before utilizing the application, first-year undergraduate students must familiarize themselves with the topic of processing goods derived from the Eri Silk species to promote awareness about conservation efforts. This course is designed for students in their first year of undergraduate studies and pursuing a degree in teaching and learning. Before the commencement of the session, students are required to undergo an examination. After completing the pretest, 30 students were assessed, and their average score out of 20 points was determined to be 8.80. The researcher has developed an application to raise awareness about the conservation of the Eri Silk breed, explicitly focusing on processing items derived from Eri Silk. This instructional resource has been developed explicitly for first-year undergraduate students, intending to facilitate teaching, and learning by providing structured exercises to enhance student knowledge acquisition. Which students demonstrate enthusiasm and a strong interest in furthering their studies? The recorded scores obtained throughout the study are subjected to averaging to determine the overall results. After receiving instruction through the implementation of an educational application focused on raising knowledge of the protection of the Eri Silk breed and the processing of products derived from Eri Silk, the students achieved a percentage score of 82.40. First-year undergraduate students were subsequently instructed to complete a post-test. The study revealed that the average post-test score was 81.33 percent, indicating that using practical applications enhances understanding of the preservation of silkworm species. Regarding the processing of items made from Eri Silk, the efficiency of the first-year undergraduate students, as determined by the researcher, is calculated as 82.40/81.33. This efficiency value aligns with the set criteria of 80/80, which aligns with the findings of Sawannarat Aphaiphong and Phumin Inpaen's research (2018, Abstract). A study by Sirisukphoka and Krutjon in 2019 found that an English vocabulary application in a multimedia format designed for the Android operating system was efficient. The study's findings revealed that the application's efficiency, as measured by the E1/E2 criteria, exceeded the stipulated threshold of 80/80, with a determined value of 80.75/88.25. This suggests that the multimedia-based English vocabulary application for the Android operating system can be an effective tool for improving language skills. The topic of interest pertains to mobile development—a proposed software tool designed to augment proficiency in English reading abilities. Grade 3 pupils utilize the flipped classroom concept in their academic studies. The analysis conducted by Phola and Sinlapanilman (2020, Abstract) revealed that the application demonstrated an efficiency of 86.32/83.52, above the predetermined threshold of 80/80. Converting data kinds is about advancing software apps on the Android operating system. The constructivist theory is employed for Mathayom 1 students. The investigation revealed that the application demonstrated an efficiency rating of 80.69 out of 83.79, satisfying the prescribed requirements of 80 out of 80.

The application effectively enhances learning outcomes by raising awareness about the conservation of the Eri Silk breed and facilitating the acquisition of knowledge related to the processing of Eri Silk products. The pretest's average score for first-year undergraduate students was 8.80, with a standard deviation (SD) of 2.33. This was observed after the students were exposed to an educational intervention focused on raising awareness about the conservation of the Eri Silkworm breed. The production and manufacturing of Eri Silk products: First-year undergraduate students must complete a post-test. The average scores of students have exhibited an increase compared to previous periods. The mean score was 16.27, with a standard deviation (SD) 1.48. A t-test analysis was conducted to compare the mean values before and after the study, resulting in a t-value of 20.68. A statistically significant difference was observed at the significance level of .05 (Surathamcharanya, 2015). The results of the analysis of the level of satisfaction of first-year undergraduate students regarding the use of the application to create awareness of conservation of the Eri Silk species regarding the processing of products from Eri Silk. For first-year undergraduate students, there was a high level of satisfaction, with an average of 4.51, because students received learning materials that met their needs, were easy to use, and were convenient for learning. The media format is beautiful and exciting, and the content meets the learning objectives. The application raises awareness about the conservation of the Eri Silk breed and the processing of products made from Eri Silk. It also encourages first-year undergraduate students to participate in activities and take action toward conservation. There are periodic assessments to monitor academic progress and incentivize students to put effort into their work. The app challenges students to be interested and provides instant success feedback when they reach a certain level of effort. Consistent with the research of Rungnapaporn Phuchada and Saweeya Suramanee (2015, Abstract) conducted a study. About developing applications for learning on tablets About the components of information systems For Mathayom 4, it was found that students were overall satisfied with the tablet learning application developed at the highest level; Phinyaphat Tasathanattrakul (2016, Abstract) conducted the study. Regarding creating a language learning kit application for children on mobile phones, it was found that the satisfaction assessment of the target group with the language learning kit application for children on mobile phones was at a high level. ; Chatyanin Kaewko and

colleagues (2020, Abstract) conducted a research study. Subject: Development of application for social studies, religion, and culture good Buddhist stories For Grade 2 students at Wat Thai Chumphon Municipal School. (Drongprachasan) The research results found that students' satisfaction level with the application for the Social Studies, Religion, and Culture courses Good Buddhist stories For Grade 2 students at Wat Thai Chumphon Municipal School. Overall, satisfaction is at the highest level. While creating awareness about the conservation of the Eri Silk breed and its products, several observations were made regarding the learning of first-year undergraduate students. These students are highly enthusiastic and determined and can perform tasks engagingly. They are responsive to learning and have confidence in their abilities, which enables them to learn independently and develop according to their potential. The teachers work collaboratively with the students to plan challenging and stimulating activities while providing guidance and advice on seeking knowledge. Recommendations in this research, the researcher has suggestions for using the research results as follows; Equipment should be prepared. and internet signal before teaching and learning every time; Students should be prepared by practicing application usage skills according to the detailed user manual for every step of organizing learning activities. Recommendations for future research; Based on the synthesized and analyzed research findings, the researcher proposes the following recommendations: It is recommended that further examination be conducted on the subject matter of Eri Silk. The development of applications on Eri Silkworms and related subjects is recommended.

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Application on Nymphaea 'Thai Lotus Species' for Creates Awareness of Undergraduate Students

Pratomporm LUEANGARAMSRI
Learning Technology and Innovation Division, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi, Pathum Thani, 12110, Thailand
pratomporn_l@mail.rmutt.ac.th
ORCID: 0009-0009-5262-4740

Thosporn SANGSAWANG*(*Corresponding author*)
Educational Technology and Communications Division, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi, Pathum Thani, 12110, Thailand
sthosporn@rmutt.ac.th
ORCID:0000-0002-7926-6949

ABSTRACT
The objectives of this study were to 1) investigate the efficiency of Application on Nymphaea 'Thai Lotus Species' for creating awareness of Undergraduate Students, 2) compare students' achievements before and after learning through the Application on Nymphaea 'Thai Lotus Species' for Creates Awareness of Undergraduate Students, and 3) examine student satisfaction towards the Application on Nymphaea 'Thai Lotus Species' for Creates Awareness of Undergraduate Students. The sample comprised 30 Secondary 4 second semester at Faculty of Technical Education, Rajamangala University Thayaburi Education Service Area Office Pathum Thani, derived through purposive sampling technique. Data was collected through an application called Nymphaea 'Thai Lotus Species' to create awareness among undergraduate students. The research used a pretest, a post-test, and a student satisfaction form. The data was analyzed using percentage, mean, standard deviation, and t-test for dependent samples. The findings showed that the Nymphaea 'Thai Lotus Species' application was adequate, with an E1/E2 score of 81.58/80.03. The study also revealed that students achieved better results after using the application to learn about creating awareness among undergraduate students. The mean and standard deviation before learning were 8.27 and 2.22, while the mean and standard deviation after education were 4.66 and .61. The t-test score used before and after schooling was 31.16 at a statistically significant level of .05. Moreover, the student satisfaction towards the Application of Nymphaea 'Thai Lotus Species' for Creates Awareness of Undergraduate Students was high.
Keywords: Application, Thai Lotus Species, Creates Awareness, Undergraduate Students

INTRODUCTION

There has been a growing interest in fostering environmental awareness and biodiversity protection in recent years, particularly among younger people. This enthusiasm has been extreme among younger people in recent years. Undergraduate students are an essential group to target in this attempt because they are the future business and political leaders and the decision-makers who will determine the future of the planet's ability to remain habitable. One effective method for fostering environmental consciousness is introducing novel plant species with significant cultural meaning, such as the Nymphaea 'Thai Lotus Species,' a type of lotus. Students have a fantastic opportunity to get interested in biodiversity, ecological value, and cultural relevance by studying this fascinating aquatic plant, which is native to the tropical regions of Southeast Asia. This introduction intends to shed light on the Significance of utilizing Nymphaea 'Thai Lotus Species' as an instructional tool to develop awareness among undergraduate students. Specifically, this introduction will focus on the relevance of using Nymphaea as an educational tool. A magnificent flowering aquatic plant, the Nymphaea 'Thai Lotus Species,' more often referred to as the Thai Lotus, flourishes in the calm waters of ponds, lakes, and slow-moving rivers. Its common name is the Thai Lotus. Because of its unique bright pink or white petals and leaves that resemble lily pads, the lotus flower is an image of beauty and peace in Thai culture. In addition to its aesthetic appeal, this species plays an essential part in maintaining the biological harmony of aquatic environments by providing a habitat for various marine organisms and food for them. Using Nymphaea 'Thai Lotus Species' as a teaching tool gives several different educational perspectives to undergraduate students. In the first place, it shows students the fascinating world of aquatic botany. It gives them hands-on experience analyzing and comprehending this one-of-a-kind plant species' life cycle, growth patterns, and reproductive tactics. In addition, participating in this activity provides a realistic setting to learn about the more extensive ecological interactions that occur within aquatic ecosystems, such as the interdependence between flora and fauna. The attitudes and interests of students towards plant-related subjects, such as botany, ecology, evolution, and zoology, are influenced by their knowledge and attitudes towards plants.

Females generally exhibit better scores in plant knowledge and attitudes than males. However, both genders show similar levels of interest in plants. A factual understanding of botany is critical in cultivating positive attitudes towards plants. Besides, linking concepts between different fields can help to reduce plant blindness.(Kubiatko, M., Fančovičová, J., & Prokop, P., 2021).

Asian traditional medicines, medicinal preparations, and herbal teas have included "Bau Luang" or Nelumbo nucifera Gaertn., an aquatic medicinal herb. These medicinal plants use N. nucifera stamens in dried and powdered form for herbal tea and traditional cures. Another water herb, "Bau Sai" (Nymphaea lotus L.), grows in similar areas. It's hard to tell the dried and powdered stamens of these two therapeutic aquatic species from their living plants. The high cost of Bau Luang stamen drives adulteration (Tungmunnithum, D., Renouard, S., Drouet, S., Blondeau, J., & Hano, C., 2020). Furthermore, Nymphaea 'Thai Lotus Species' holds cultural Significance as it links environmental research with Thai heritage. In addition to being educated about the biological features of plants, students are provided with an understanding of the symbolic Significance of plants in Thai rituals, art, and folklore. The establishment of this cultural association nurtures a more profound recognition of the interdependence between nature and human communities, promoting a collective consciousness of global citizenship and the obligation to save our planet. Including Nymphaea 'Thai Lotus Species' in undergraduate courses is the overarching educational goal of fostering environmental care and promoting sustainability. This platform offers students a concrete opportunity to directly observe the effects of human activity on natural environments, hence strengthening the importance of conservation initiatives. In summary, the utilization of Nymphaea 'Thai Lotus Species' within the context of undergraduate education serves as a powerful instrument for generating consciousness and cultivating a more profound comprehension of environmental concerns. By integrating scientific inquiry, cultural understanding, and ecological consciousness, this pedagogical method enables students to engage in the worldwide endeavour toward a heightened level of sustainability. As we progress, we must persist in examining inventive and captivating approaches to motivate the forthcoming cohort of environmental leaders. Lotus root (Nelumbo nucifera G.) is a high-economic value crop worldwide. This study evaluated the storage characteristics of lotus root colour, sensory texture, and fatty acids at different harvest periods. The results of this study provide a reference for lotus root storage and a basis for the molecular breeding of long-term-storable lotus root (Min, T., Niu, L., Feng, X., Yi, Y., Wang, L., Zhao, Y., & Wang, H., 2021). Science education plays a crucial role in promoting social sustainability and understanding the importance of Planet Earth. Post-humanist ideologies emphasize the co-constitutive nature of the world, challenging anthropocentric and Western worldviews. By developing scientific literacy and literacies, students can contribute to a sustainable and peaceful world, addressing the interconnectedness of micro to macro-life and cultural and environmental ecologies (Jeong, S., Sherman, B., & Tippins, D., 2021).

Lotus and Waterlily Museum Rajamangala University of Technology Thanyaburi was an agency that presented guidelines consistent with the Plant Genetic Conservation Project Under the Royal Initiative of Her Royal Highness Princess Maha Chakri Sirindhorn. The objective is to enhance the knowledge and skills of personnel and organizations, introduce volunteers and companies to plant genetic conservation, foster connections between various organizations, including government agencies and private sectors, and establish a shared plant genetics database system across the country. The Sirindhorn Bua Museum is committed to preserving and advancing lotus genetics, a crucial aspect of the plant family. The museum is actively collecting and preserving various species of lotus, aiming to raise awareness and protect these endangered species while promoting their propagation and improvement—Bua Sirindhorn Museum, A collection source. Planting, maintaining, and using lotus species, including being a lotus species information centre, will benefit people. Lotus, the queen of dry aquatic plants, is famous worldwide. The following lotuses are available: royal, western, Jong Konni, Victoria, water lily, and sectional. Head or underground rhizome. The single leaves alternate. The oval, thick, rounded leaves measure 15-25 cm. Leaf edges are smooth or toothed. Leaf blades are wide. Bright green leaves have glossy tops. Soft hairs cover leaf and blossom stalks. White, yellow, pink, or brilliant crimson blossoms are usually fragranceless. Its rhizome produces one bloom. Round, fat flower stems. The species determines the smooth or hairy surface. Send water-floating flowers. Flowers are cup-shaped or circular. Layers conceal several petals. Flowers blossom afternoons and evenings. Full-blooming blossoms, 6-8 cm deposit/fruit, fleshy fruit. Oval to spherical, thick, black shell, many seeds. Flowers thrive in rainy weather. This "Bua Jongkonnee" resembles all lotus species. Aquatic roots are mud-buried. Peelable bark forms a web on this juvenile bloom stem. Smooth, thorny skin. Water-floating leaves. No jagged leaf edges. Lovely lotus leaves. They are flowering above water. They bloom midday. Thin, overlapping petals All flowers float and thrive—one kind. Pink blooms turn white and green before blooming. Black fruit/deposit seeds with meat Looks like clear jelly. Lotus-like "Victoria Lotus" leaves are prominent. The water lily is named for its spherical shape and raised shell-like borders—thorny leaf stalks. "Water lilies and water lilies" are aquatic perennials. A small underground tuber is the trunk—nearly spherical leaves. Margins have waves. The leaf base is deep—convex leaf veins. Single blooms and alternate leaves float in circles on the water—small, flowering above water, tall stem, 4 sepals.

The Thai Lotus, a species native to Southeast Asia's tropical waterways, is a captivating aquatic plant that has captivated botanists and horticulturists. This marine beauty teaches undergraduate students about aquatic botany, life cycle, and adaptive tactics. It also promotes cultural exchange, enhancing Thai heritage, and promoting global citizenship and environmental responsibility. By observing the complex web of life in aquatic areas, students learn about human impacts on vulnerable ecosystems and inspire conservation and preservation responsibilities. This approach effectively teaches environmental awareness and sustainability in a complex ecological context. The flowers have numerous hidden layers, stamens, and round fruit containing tiny seeds. Two types of lotus flowers are native to Thailand.The first is the water lotus, with white flowers with light indigo petals at the tips. The second type has pale purple flowers that turn pink over time. White lotus flowers can occasionally be found and used for ornamental purposes. The flower stalks are eaten as a vegetable. "Lotus" is in the lotus genus. The leaves are raised above the water. Grows by flowing and chewing beneath the ground. The varieties of lotus that are popularly planted at present include the types of Chat White, Chat Kaew, and Chat Red. Chat lotus or Sattabongkot are pink, white, and white with pink ends and pink with white spikes. Of all the lotuses, "Luang Lotus" is the most critical lotus economically, and farmers grow the most.

There are two essential purposes of planting: planting to cut flowers and buds, which are used to worship Buddha, and planting to collect seeds. The Thai Lotus, a species native to Southeast Asia's tropical waterways, is a captivating aquatic plant that has captivated botanists and horticulturists. This marine beauty teaches undergraduate students about aquatic botany, life cycle, and adaptive tactics. It also promotes cultural exchange, enhancing Thai heritage, and promoting global citizenship and environmental responsibility. By observing the complex web of life in aquatic areas, students learn about human impacts on vulnerable ecosystems and inspire conservation and preservation responsibilities. This strategy is an effective way to teach environmental awareness and sustainability in an increasingly complex ecological context. The problem situation calls for teaching Applications on Nymphaea 'Thai Lotus Species' to create awareness among Undergraduate Students to enhance efficiency and create knowledge. Thai lotus application at Rajamangala University enhances undergraduate students' learning experience, satisfaction, and achievement in Thai language and culture.

LITERATURE REVIEW
The aquatic plant genus Nymphaea, known as water lilies, is renowned for its cultural value and exquisite beauty. A study was conducted to raise awareness of Nymphaea 'Thai Lotus Species' among undergraduate students. Among the many species, the Nymphaea 'Thai Lotus' stands out due to its brilliant colours and distinctive qualities. This literature study aims to investigate the use of Nymphaea 'Thai Lotus Species' in developing awareness among undergraduate students, emphasizing the possible benefits of this application for education and environmental awareness. Botanical Significance of the Nymphaea 'Thai Lotus Species' The water lily known as Nymphaea 'Thai Lotus Species' is native to Southeast Asia. It is famous for its remarkable look, distinguished by huge, round leaves and colourful, multi-petaled flowers. Its leaves and flowers both have a distinctive appearance. Due to the singularity of its botanical composition, it presents an exciting subject for investigation and admiration. Pupils interested in botany and ecology will find that understanding its life cycle, habitat requirements, and adaption mechanisms can be a significant instructional resource for those pupils. The lotus flower has a significant cultural and symbolic importance in many cultures. The lotus flower represents spiritual enlightenment, purity, and progress. In Thai culture, the lotus is particularly revered and plays a prominent role in various rituals and ceremonies. By introducing Nymphaea 'Thai Lotus Species' to undergraduate students, educators can tap into this cultural Significance to foster an appreciation for diversity, spirituality, and interconnectedness with nature. Environmental Awareness and Conservation Studying Nymphaea 'Thai Lotus Species' can be a gateway to broader discussions about environmental conservation. It allows students to explore wetland ecosystems, biodiversity, and the importance of preserving natural habitats.

Understanding the threats these plants face, including habitat loss and pollution, can still create a sense of responsibility toward environmental stewardship. Educational Pedagogy and Experiential Learning, incorporating Nymphaea 'Thai Lotus Species' into undergraduate curricula can enhance the learning experience through hands-on, experiential activities. Establishing botanical gardens or aquaria with live specimens can give students direct access to observe and study these plants in controlled environments. Such interactive learning experiences can deepen their understanding of plant biology and ecology. Art and Aesthetic Appreciation The visual appeal of Nymphaea 'Thai Lotus Species' lends itself to artistic expression. Students can engage in activities like sketching, painting, or photography, drawing inspiration from the intricate patterns and vibrant colours of the lotus flowers. This artistic exploration encourages creativity and reinforces the idea of finding beauty in nature. Promoting Mindfulness and Well-being, engaging with natural environments, including those cultivated with Nymphaea 'Thai Lotus Species,' has been shown to affect mental well-being positively. These serene aquatic habitats can serve as a sanctuary for students to de-stress, practice mindfulness, and develop a deeper connection with the natural world. Applying Nymphaea 'Thai Lotus Species' in undergraduate education offers a multifaceted approach to fostering

awareness and appreciation among students. From its botanical Significance to its cultural and environmental relevance, this unique plant species provides a rich platform for interdisciplinary learning. Educators can inspire a new generation of environmentally conscious individuals who value and protect the natural world by incorporating Nymphaea' Thai Lotus Species' into educational settings.

METHODS

Population and sample group:

The population includes first-year undergraduate students in the academic year 2022. Faculty of Industrial Education Rajamangala University of Technology Thanyaburi students 404 individuals selected the target group using the sampling method, including the sample group in this research: first-year undergraduate students, Faculty of Industrial Education. Educational Technology and Communication Department Rajamangala University of Technology Thanyaburi, 27 students. During the second semester of the academic year 2022, a specific sample was collected using "Purposive Sampling" for a class on rice.

Instruments of Research:

(1) An Application on Nymphaea 'Thai Lotus Species' for Creates Awareness of Undergraduate Students. (2) Questionnaire for Upper Undergraduate Students seeking the opinions of industry professionals evaluating the quality of augmented reality media on Thai rice products., and (3) The pretest and the subsequent test., and (4) An evaluation form for students in Undergraduate Students the use of Application on Nymphaea 'Thai Lotus Species' for Creates Awareness of Undergraduate Students.

Data collection:

Collecting data includes researching many concepts, fundamentals, and theories associated with producing Applications on Nymphaea 'Thai Lotus Species' for creating awareness among Undergraduate Students. The increased reality material that the researchers generated should be brought to the professionals so that they can review it. To ensure consistency between content, language, questions, teaching activities, and creation aim, consult with measurement and evaluation specialists to determine tool usefulness. Then, make the necessary improvements and corrections to ensure that everything is accurate and comprehensive, just as the recommendations of the specialists suggest in every regard. After that, the augmented reality media was utilized three times with students from schools that were not part of the sample group, including measuring the effectiveness of the students on an individual level. After conducting an efficiency trial with small groups and field testing, the team adjusted and changed until the product reached an acceptable level of performance. As a result, media based on augmented reality was utilized with the sample population.

Statistics used to analyze data:

(1) Determine whether using Application on Nymphaea 'Thai Lotus Species' to create awareness among Undergraduate Students is effective. By applying the equation for calculating efficiency E1/E2 (2), Compare the pretest results with the post-test using a t-test for dependent samples with a significance level of .05 (3). Using the mean and standard deviation (SD.), investigate the contentment of Undergraduate Students with access to augmented reality media.

FINDINGS

Table 1: Report for Undergraduate Students totalling 30 people summarizes the findings of Application on Nymphaea 'Thai Lotus Species' for Creates Awareness of Undergraduate Students.

List	Full score	Average score	percentage	Benchmark	E1/ E2
Score during study	50	41.17	81.58	80	81.58
Posttest	20	16.33	80.03	80	81.03

Table 1 shows the results of using the Application on Nymphaea 'Thai Lotus Species' to create awareness among Undergraduate Students. Then, take the results of the scores from the test that 30 Undergraduate Students completed. The average percentage score was 81.58, while the average post-test score was 81.03. This indicates that the Nymphaea 'Thai Lotus Species' application effectively raises awareness among undergraduate students, as it satisfies the 80/80 requirements.

Table 2. This study aimed to compare the pretest and post-test performance of students who had learned about the Application of Nymphaea 'Thai Lotus Species' for creating awareness among Undergraduate Students.

	Full score	Average score	SD.	t	Sig.(2-tailed)
Pretest	96.03	8.77	2.22	31.16	.00
Posttest	68.47	16.33	1.45		

As shown in Table 2, the results of applying Application on Nymphaea 'Thai Lotus Species' for Creates Awareness of Undergraduate Students were as follows: The standard deviation for the pretest was equal to 2.22, and the average score was 8.27. The pupils learned about applying Nymphaea 'Thai Lotus Species' to create awareness among Undergraduate Students. After that, the pupils' overall performance on the post-test averaged a zero. The standard deviation is 8.77, the mean value is 16.33, and the t-test analysis before and after the study is 31.16, statistically significant at .05.

Table 3. The following are the findings from an investigation into how Undergraduate Students were satisfied with the Application of Nymphaea 'Thai Lotus Species' for Creates Awareness of Undergraduate Students.

	Evaluation list	$\bar{x}$	SD.	Interpret results
1. Media				
1.1	Clear explanation of media usage	4.86	.43	The most
1.2	Beautiful and interesting media format	4.53	.72	The most
1.3	Easy to use and easy to learn	4.60	.76	The most
	Total average	**4.69**	**.57**	**The most**
2. Content				
2.1	The content meets the learning objectives	4.50	.81	The most
2.2	The language used in the lessons is easy to understand	4.46	1.15	The most
2.3	Presentation of content is easy to understand	4.83	.37	The most
2.4	The amount of content in each story is appropriate	4.63	.77	The most
	Total average	**4.60**	**.77**	**The most**
3. Measurement and evaluation				
3.1	Clarity of questions and answers	4.83	.50	The most
3.2	Appropriateness of the number of assessments	4.53	.47	The most
3.3	Alignment of assessments with content	4.30	1.07	The most
3.4	Promoting self-directed learning	4.56	.62	The most
	Total average	**4.55**	**.69**	**The most**
4. Instructional activity organization				
4.1	Encouraging learner engagement in activities	4.96	.18	The most
4.2	Facilitating learning anywhere, anytime	4.80	.54	The most
4.3	Promoting self-directed learning	4.86	.34	The most
4.4	The media is easy to use and suitable for learners	4.53	.67	The most
	Total average	**4.79**	**.43**	**The most**
	Total average	**4.66**	**.61**	**The most**

According to Table 3, the findings of the evaluation of the level of satisfaction that Undergraduate Students have regarding the Application of Nymphaea 'Thai Lotus Species' for creating awareness Undergraduate Students reveal that a total of 27 students have, in general, expressed a high level of satisfaction, with an overall average score of 4.66 and a standard deviation of.61. The highest level, which was "Satisfied with Application on Nymphaea 'Thai Lotus Species' for Creates Awareness of Undergraduate Students," refers to the process of bringing awareness to undergraduate students.

CONCLUSIONS AND EVALUATION

Application on Nymphaea 'Thai Lotus Species' for Creates Awareness of Undergraduate Students Improves Teaching Efficiency First-year the Rajamangala University of Technology Thanyaburi students. To achieve an efficiency of 80.80 KW-CAI, a study showed that the first-year undergraduate class management at the Rajamangala University of Technology Thanyaburi used an application on the Nymphaea 'Thai Lotus Species' to create awareness among students. Pretest instruction averaged 68.47, or 57.06 out of 27 students. Researchers taught Application on Nymphaea 'Thai Lotus Species' for Creates Awareness of Undergraduate Students first-year students the results of using the Application on Nymphaea 'Thai Lotus Species' to create awareness among Undergraduate Students. Then, take the results of the scores from the test that 30 Undergraduate Students completed. These scores were computed as an average percentage of 82.33, and the mean rate of post-test scores was 81.67. Demonstrates that the Application of Nymphaea 'Thai Lotus Species' for Creates Awareness of

Undergraduate Students is efficient according to the requirements 80/80, meaning that E1/E2 is equivalent to 82.33/81.67, which satisfies the assumptions. Applying Application on Nymphaea 'Thai Lotus Species' for Creates Awareness of Undergraduate Students were as follows: The standard deviation for the pretest was equal to 2.22, and the average score was 8.77.

The pupils learned about applying Nymphaea 'Thai Lotus Species' to create awareness among Undergraduate Students. After that, the pupils' overall performance on the post-test averaged a zero. The standard deviation is 1.45, the mean value is 16.33, and the t-test analysis before and after the study is 20.96, statistically significant at .05. The evaluation of the level of satisfaction that Undergraduate Students have regarding the Application of Nymphaea 'Thai Lotus Species' for creating awareness of Undergraduate Students reveal that a total of 27 students have, in general, expressed a high level of satisfaction, with an overall average score of 4.66 and a standard deviation of .61. The highest level, which was "Satisfied with Application on Nymphaea 'Thai Lotus Species' for Creates Awareness of Undergraduate Students," refers to the process of bringing awareness to undergraduate students, due to their acquisition of knowledge regarding the activities implemented inside the session. The application aims to cultivate student satisfaction and foster a desire for learning by providing educational content on the Application of Nymphaea 'Thai Lotus Species' to create awareness among Undergraduate Students. Teaching via the utilization of applications offers a comprehensive acquisition of knowledge. Assists in developing critical thinking skills. And progress systematically as the pupils have acquired the ability by the learners' progression. The objective is to present learning progress to enhance students' engagement periodically. The observations made while educating and learning about the Application of Nymphaea 'Thai Lotus Species' for creating awareness among Undergraduate Students resulted in rapid success. The pertains to the cohort of students in their initial year of undergraduate studies at Rajamangala University of Technology Thanyaburi. Students exhibit strong determination and enthusiasm towards their academic pursuits, facilitating rapid and efficient learning. Individuals are exposed to educational stimuli through various forms of media, reducing independent learning and enabling learners to cultivate their abilities by their inherent capacities. At Koi, educators collaborate with students to foster an environment that promotes intellectual stimulation, challenges individuals, provides encouragement and offers guidance in pursuing knowledge.

Recommendations

In this study, the researcher proposes recommendations for the practical use of the research findings in the following manner. The Application on Nymphaea 'Thai Lotus Species' is utilized to create awareness among Undergraduate Students for deposit purposes. The academic program is designed for incoming first-year undergraduate students at Rajamangala University of Technology Thanyaburi. Self-directed learning is a crucial endeavour that holds significant importance. More learner preparedness can benefit the arrangement of instructional and educational activities to attain predetermined objectives. Learners must be adequately prepared by providing instruction on using media to enhance teaching and learning in alignment with the acquired knowledge, including comprehensive approaches and procedures for incorporating media into the pedagogical process at each stage of preparing educational activities. Researchers are acquiring knowledge by utilizing the auspicious Application of Nymphaea 'Thai Lotus Species' to create awareness among Undergraduate Students. This academic program is designed for incoming undergraduate students at Rajamangala University of Technology Thanyaburi. This approach can be implemented in learning management across several subject groups and modify instructional tasks to align with the educational activities prescribed for a particular grade level or learning cohort.

Suggestions for future research.

The researcher posits the subsequent recommendations based on the synthesis and analyzed research data. It is essential for educators to actively participate in significant exchanges with their students, especially when disseminating information using instructional materials related to the Application of Nymphaea 'Thai Lotus Species' for Enhancing Awareness among Undergraduate Students. The academic curriculum has been tailored to cater to incoming undergraduate students at the Rajamangala University of Technology Thanyaburi. The study aims to evaluate the effect of media integration on student engagement and comprehension. Furthermore, this study aims to investigate the impact of media in resolving student uncertainties and facilitating the process of answering questions. This study will use a mixed-methods approach to examine the advantages and disadvantages of integrating media in educational environments. The results of this research will contribute to the current scholarly understanding of instructional techniques and offer valuable insights into the most effective ways to include media to enhance teaching and learning experiences. Students should develop a well-organized study timetable corresponding to the sequential subject phases specified in the Application on Nymphaea 'Thai Lotus Species' for Enhancing Awareness among Undergraduate Students. Corresponds to developing improved pedagogical approaches for online learning and instruction across various educational levels and subject areas, including adult education. This research examines the current state of the media and its prospects within the framework of educational practices and policies. In addition, it emphasizes the vital role television content plays

as an important source of good audiovisual educational material. This study evaluates the conditions in Cyprus and Greece by drawing on relevant literature resources, doing a detailed review of existing research, and examining the conclusions of several previous studies and research papers from credible web sources. The sources mentioned were used as reference material for the current investigation. In a preliminary analysis, individuals who were both adult learners and educators aged 18 and above implemented the methods outlined earlier. As a part of the research, the study incorporated historical components and used data from previous publications. The pilot case study discovered that television programs' content can impact adult learners' opinions about their knowledge and learning experiences in online environments, especially regarding their generational cohort. The findings also showed that the application of audiovisual media technologies and content in online education, also known as audiovisual media communications, can support technology-enhanced learning through non-verbal communication in the modern day and age of digital technology. One of the main findings of this article is the importance for education administrators and educators to continually address the international genealogical characteristics and habits, inherent and distinctive attributes, and socio-cultural identity of learners. This finding is one of the article's most important takeaways. In addition, it highlights how important it is to acknowledge the various international social phenomena that have occurred in the past and are occurring in the present, such as the media socio-phenomenon, the Internet phenomenon, the revival phenomenon, and others. This concern is essential for maintaining a high education standard and cultivating an environmentally sustainable future (Nicolaou, C., 2021). The academic curriculum has been tailored to cater to incoming undergraduate students at the Rajamangala University of Technology Thanyaburi. To raise awareness among undergraduate students, it is crucial to thoroughly examine the results obtained from implementing the learning model through the Application of Nymphaea 'Thai Lotus Species.' The academic program is designed to meet the specific requirements of first-year undergraduate students currently enrolled at Rajamangala University of Technology Thanyaburi. To cater to the varying requirements of different curricula, especially those that prioritize creative thinking skills, it is crucial to integrate instructional resources that encourage students' cognitive growth. Cultivating systematic thinking skills essential in academic and professional realms is imperative. These skills involve addressing problems and tasks by ensuring that all relevant elements are thoroughly analyzed and examined systematically. Developing critical thinking skills and associated cognitive processes is significant in academic environments. An empirical inquiry is necessary to examine the consequences that arise from the adoption of the self-directed learning strategy assisted by the Application of Nymphaea 'Thai Lotus Species' for creating awareness among Undergraduate Students. The academic curriculum has been tailored to cater to incoming undergraduate students at the Rajamangala University of Technology Thanyaburi. Educators strive to foster fair improvement of students' skills by implementing tactics that accommodate the varied range of learning needs among pupils.

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Blended Teaching Online According to the Super Star Learning Pass model on Basic Computer Application for Shunde Technical Vocational College

Sun HE
Learning Technology and Innovation Division, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi, Pathum Thani, 12110, Thailand
Sun_h@mail.rmutt.ac.th, ORCID:0009-0009-8753-7188

Thosporn SANGSAWANG*(*Corresponding author*)
Educational Technology and Communications Division, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi, Pathum Thani, 12110, Thailand
sthosporn@rmutt.ac.th, ORCID:0000-0002-7926-6949

ABSTRACT
The objectives of this study were to (1) investigate the efficiency of blended teaching online according to the Super Star Learning Pass model on Basic computer application for Shunde Technical Vocational College, (2) compare students' achievements before and after learning through blended teaching online according to the Super Star Learning Pass model on Basic computer application, and (3) examine students' satisfaction with of using blended teaching online according to the Super Star Learning Pass model on Basic computer application. The sample comprised 30 students at Shunde Technical Vocational College in China, derived through purposive sampling. The instruments used to collect the data were (1) blended teaching online according to the Super Star Learning Pass model on Basic computer application for enhancing learning achievement, a student's pretest and a posttest, and a teacher's satisfaction form. The data analysis statistics were percentage, mean, standard deviation, and the t-test for the dependent sample. The research findings revealed that applying blended teaching online according to the Super Star Learning Pass model on Basic computer applications for enhanced learning achievement was efficient by E1/E2 (81.40/81.23). The evaluation of content blended teaching online according to the Super Star Learning Pass model on Basic computer application teaching by the experts was appropriate at the excellent level ($\bar{x}$=4.78, SD. = .58). The evaluation of students' satisfaction with blended teaching online according to the Super Star Learning Pass model on Basic computer applications in China by 30 students. The overall students' satisfaction was a strongly agreeing level ($\bar{x}$=4.51, SD. = .50). When considering each item, it was found that blended teaching online according to the Super Star Learning Pass model on Basic computer application methods was strongly agreeing level ($\bar{x}$ =4.67, SD. = .48) and combined teaching online according to the Super Star Learning Pass model on Basic computer application was strongly agree level ($\bar{x}$= 4.60, SD. = .50), respectively. According to Shunde Technical Vocational College, teachers' satisfaction with blended teaching online according to the Super Star Learning Pass model on Basic computer applications for enhanced learning achievement was high, with a mean of 4.51.
Keywords: Blended Teaching Online, Super Star Learning Pass model, Basic Computer Application

INTRODUCTION
This study explores blended Learning, mixed Learning, self-directed Learning, and education by conducting a comprehensive literature review using reputable sources such as China Knowledge Network and school libraries. In addition, a thorough search of the university library's collection was conducted to identify pertinent literature and materials about constructivism, basic learning theory, and the memory pyramid. Engaging in reading, summarizing, and organizing scholarly literature on blended education facilitates. This framework is based on using a learning platform and its practical application in real-world teaching scenarios. With its dedication to education, Shunde Technical Vocational College has successfully implemented the Super Star Learning Pass system. A novel approach blends classic teaching methods with cutting-edge internet tools to make Basic Computer Applications learning lively. This paradigm proposes a new way to redefine education. This method combines synchronous and asynchronous features. Shunde Technical Vocational College prepares students for the changing digital landscape by combining technology and traditional pedagogy. Basic Computer Applications at Shunde Technical Vocational College have transformed student learning. The Super Star Learning Pass helps kids thrive academically in our tech-driven era. The results show that educators used asynchronous and synchronous digital technology and instructional methods to help students learn, measure their progress, and communicate with parents remotely. The results imply that asynchronous and synchronous modalities work best for online student learning. The idea suggests ways for educators to use asynchronous and synchronous digital technologies and instructional methods in a structured learning sequence (Moorhouse et al.; K., 2021).

The advantages of Blended Learning Teaching have changed from traditional to innovative, and it will become the norm. Colleges and universities will deeply integrate information technology and teaching in the "Internet" era to promote AI and other new technologies to empower education. Teaching in intelligent classrooms will become standard. "Artificial Intelligence Education" changed the smart classroom's teaching and learning goals to introduce a new education paradigm. Learning prioritizes higher-order problem-solving, reflection, and evaluation over literacy, comprehension, and other surface abilities. Deeper Learning using intelligent classroom technology is essential for talent training now and in the future. Faculty are exploring online and offline blended teaching models, encouraging teaching interaction, improving relevance and adaptability, and using big data, learning analytics, and other technologies to enhance students' mastery of the course's knowledge, skill, and attitude goals. Blended Learning blends online and classroom instruction. The Super Star Learning Channel, a blended learning portal, combines online and offline learning approaches for better results. This unique technique has changed teaching approaches to meet student demands. Blended Learning in primary education may benefit from teacher-led and digital instruction. A charter school network sample of 2217 pupils showed significant reading proficiency gains compared to a control group. In primary school, blended Learning can teach reading, even with initial variations between cohorts. This suggests that blended Learning can increase reading skills across grade levels and ethnicities (Macaruso et al.; J., 2020).

The Super Star learning channel merges Super Star's massive digital library of books, magazines, and high-quality course resources into a professional mobile learning platform for smartphones, tablet PCs, and other mobile terminals. Mobile Learning from study links is faster and easier than PC learning. The Super Star lets teachers create courses, invite qualified students, design and manage class activities, and more. Instead of tracking learning data and statistics, The Super Star Learning Channel produces and provides learning resources. The mobile library section offers many books, periodicals, newspapers, open courses, and other learning resources; the mobile museum section recommends domestic museums, national treasures, and exhibitions; small programmers, school recruitment and employment, creative tools, interactive tools, and other columns provide diverse consulting information; and the cloud disc, notes, and collection functions of learning at Shunde Technical Vocational College has achieved success in Basic. The Super Star Learning Pass is a blended teaching method used at Shunde Technical Vocational College, combining traditional face-to-face teaching with online platforms. This approach enhances student involvement and academic achievements by fostering critical thinking skills and problem-solving abilities. The Super Star Learning Pass caters to individual learning styles and growth rates, allowing for personalized educational classes and adaptive assessments. This approach has increased student engagement and enthusiasm towards knowledge pursuit, fostering self-confidence and academic achievement. Using a vocational course in teaching English focuses on the effectiveness of a flipped classroom model in enhancing critical thinking skills (Karapetian, A., 2020).

In general, implementing the Blended Teaching Online model, under the guidance of the Super Star Learning Pass framework, has significantly impacted Basic Computer Application education at Shunde Technical Vocational College. The model's potential to revolutionize the educational experience in the digital age is underscored by the good outcomes in student engagement, performance, and overall satisfaction.

LITERATURE REVIEW
Incorporating technology within education has revolutionized how pupils attain knowledge and develop their talents. Blended teaching, characterized by integrating traditional classroom instruction with online Learning, has evolved as a potent educational methodology. This literature analysis examines utilizing the Super Star Learning Pass concept in introductory computer application courses at Shunde Technical Vocational College. The model emphasizes a pedagogical approach that combines several teaching methods to improve students' comprehension and mastery of essential computer skills.

The Implementation of Blended Teaching in Higher Education
Blended instruction is an educational approach that capitalizes on the merits of conventional in-person teaching and digital learning platforms. The proposed methodology facilitates a heightened level of adaptability and individualization in the educational process, accommodating a wide range of learning preferences and rates of progress. Research has indicated that integrating in-person and online training can yield several benefits, including increased student engagement, excellent retention rates, and enhanced learning outcomes. The study explores the perceived efficacy of Personalized Learning (PL) activities in supporting students' psychological need satisfaction and intrinsic motivation in online courses. Self-determination theory reveals the potential of PL principles in meeting students' needs and interests, demonstrating their engagement and effectiveness (Alamri et al.; S., 2020).

The model is known as the Super Star Learning Pass.
Blended Learning, an instructional approach integrating traditional face-to-face instruction and online learning components, has garnered significant traction in higher education. This study aimed to assess educators'

pedagogical and instructional design approaches in blended learning environments and their influence on student's ability to engage in self-directed Learning. A survey was conducted on a sample of 294 participants from a French institution, with data collection being carried out by administering questionnaires and observations. The findings indicate that blended learning courses only sometimes foster a student-centered atmosphere. Additionally, Self-Directed Learning experienced a significant improvement in three of the seven lessons designed to be student-centered. Additional research is required to validate the association between educational endeavors and the development of Self-Directed Learning (Adinda, D., & Mohib, N., 2020).

Instruction in Primitive Software Applications for Computers
Including fundamental computer application courses is highly significant in equipping students with essential digital literacy skills. The curriculum includes various subjects, including word processing, spreadsheet management, presentation software, and internet navigation. Students must excel in their academic pursuits and future career paths for effective instruction in these areas. The structural structure of digital media programs in Arab institutions centers around integrating multimedia and technology courses within their academic curriculum. The primary objective of these courses is to provide students with fundamental digital literacy skills crucial for success in the contemporary job market. The organizational framework encompasses a range of essential competencies, such as computer literacy, fluency in multimedia applications, graphic design expertise, and software utilization. The study utilizes a mixed-methods methodology to examine many aspects, including the composition of study plans, the proportion of Information Technology (IT) courses compared to other classes, and the specific material covered in IT courses. This study aims to assess the appropriateness of these courses for students pursuing postgraduate Education (Aissani et al.; M., 2022).

Implementation at Shunde Technical Vocational College
Integrating the Super Star Learning Pass model in introductory computer application courses at Shunde Technical Vocational College represents a forward-thinking approach to teaching and Learning. By combining the strengths of traditional classroom instruction with the flexibility and interactivity of online platforms, the model caters to the diverse needs of students. Preliminary studies have shown positive outcomes, including increased student engagement, higher retention rates, and improved assessment scores (Institutional Research Office, Shunde Technical Vocational College, 2022).

Concerns and Things to Consider
Although the Super Star Learning Pass model exhibits potential, it is imperative to note the potential obstacles that may arise during its implementation. These topics encompass concerns about the accessibility of technology, the levels of digital literacy among pupils, and the necessity for continuous professional development for instructors. Furthermore, it is imperative to prioritize the scalability and sustainability of the model within the institutional framework to achieve long-term success. The use of the Super Star Learning Pass model in introductory computer application courses at Shunde Technical Vocational College signifies a forward-thinking approach aimed at improving educational standards by integrating blended teaching methods. This literature evaluation elucidates the possible advantages of the paradigm, encompassing heightened student engagement and enhanced learning outcomes. Nevertheless, it is crucial to acknowledge and tackle the obstacles that may arise and to prioritize continuous professional growth to guarantee the long-term effectiveness of this pioneering methodology (Purba et al., 2020).

Incorporating the Super Star Learning Pass model into the fundamental computer application classes offered by Shunde Technical Vocational College is a significant step forward in improving the educational experience for students through the use of blended methods of instruction. This evaluation of the relevant literature illustrates the potential benefits of this strategy, including increased student engagement and enhanced learning outcomes. Nevertheless, to ensure the continued success of this creative method, it is necessary to solve obstacles and consider ongoing professional development.

METHODOLOGY
These research were to (1) assess the effectiveness of implementing the Super Star Learning Pass model for blended online teaching in the context of Basic computer application at Shunde Technical Vocational College, (2) compare the academic performance of students before and after engaging in blended online teaching using the Super Star Learning Pass model for Basic computer application, and (3) evaluate students' satisfaction with the utilization of the Super Star Learning Pass model for blended online teaching in the context of Basic computer application. The study included 30 students from Shunde Technical Vocational College in China, selected using purposive sampling. The data collection instruments employed in this study consisted of three components: (1) the implementation of blended teaching online, using the Super Star Learning pass paradigm, to enhance students' learning achievement in basic computer application; (2) a pretest and posttest administered to the students; and (3) a satisfaction form completed by the teachers.

Research Questions and Hypothesis

1) How does implementing the Super Star Learning Pass model impact student engagement in introductory computer application courses at Shunde Technical Vocational College?

2) What are the effects of blended teaching on student retention rates in introductory computer application courses compared to traditional face-to-face instruction?

3) Students in the Super Star Learning Pass model group will exhibit higher proficiency levels and understanding of fundamental computer skills than those in the traditional instruction group.

Conceptual Framework

Independent Variable

Dependent variable

ADDIE model
Step 1 Analysis
Step 2 Design
Step 3 Development
Step 4 Implementation
Step 5 Evaluation

The blended teaching online according to the Super Star learning pass model on Basic computer application for Shunde Technical Vocational College

Students' achievements before and after learning through blended teaching online according to the Super Star learning pass model on Basic computer application for Shunde Technical Vocational College teaching are statistically significant at a level of .05.

Instructors' satisfaction among Shunde Technical Vocational College instructors regarding incorporating blended teaching online according to the Super Star learning pass model on the Basic computer application is high level 4.5.

Figure 1. Conceptual framework of the effect of using blended teaching online according to the Super Star Learning Pass model on Basic computer application achievement of Shunde Technical Vocational College students in China.

Theoretical Perspective

The ADDIE method is being utilized in the Conceptual framework of the effect of using blended teaching online according to the Super Star Learning Pass model on Basic computer application achievement of Shunde Technical Vocational College students in China, aiming to enhance Learning through theoretical considerations. Basic computer applications implement the ADDIE model to promote active Learning through interactive activities and critical thinking. According to the Super Star Learning Pass model on Basic computer applications and resources online, the model encourages students to use blended teaching online, collaborate on digital projects, and solve problems using technology. The ADDIE model also promotes cognitive load theory, allowing teachers to use multimedia presentations, interactive simulations, and online quizzes to improve student learning outcomes and motivation. The ADDIE model also integrates content, pedagogy, and technology, linking technology use to learning objectives and adapting pedagogical methodologies to leverage IT. Collectivism emphasizes networks and digital links in Learning, promoting the learning effect and personal development of students. Ubiquitous Learning, facilitated by mobile devices, can be enhanced on Basic computers in China. The ADDIE model also promotes inclusive and accessible education by accommodating varied learning styles and demands.

Research of Methodology

This study explores the application of information technology in blended teaching online according to the Super Star Learning Pass model on Basic computer application for Shunde Technical Vocational College. The research involved 120 majors selected through purposive sampling. The study used literature analysis, observation, interview, and field research to analyze the impact of technology on blended teaching online according to the Super Star Learning Pass model on Basic computer application achievement. The ADDIE model assessed content and media quality, learning achievement, and satisfaction. Based on the Super Star Learning Pass model of Basic computer application, the findings emphasize the significance of integrating technology in online blended teaching. It helps enhance theoretical frameworks and drive further development. The study aims to identify critical issues in current teaching methods and explore blended teaching according to the Super Star Learning Pass model of Basic computer application theory within the context of blended teaching online according to the Super Star Learning Pass model. Ultimately, this will improve scores and performance in blended teaching online according to the Super Star Learning Pass model of Basic computer application. Data The researcher experimented with a group pretest and posttest test scores design; the population was selected by purposive sampling. The measure and

statistics and assessment are the blended teaching online according to the Super Star Learning Pass model on Basic computer application in teaching on Basic computer application, pretest-posttest test scores, questionnaire of satisfying data were E1/E2, mean, standard definition, t-tests the dependent sample Statistics. Amassment statistics data after the experiment and calculate (O1) and (O2) for the mean ($\bar{x}$)and also compared, arrangement for the experimental model by blended teaching online according to Super Star Learning Pass model on Basic computer application to learn by themselves. (1)A request for cooperation with 120 students from Shunde Technical Vocational College in China. (2) Plan to use blended teaching online according to the Super Star Learning Pass model on Basic computer applications in China. (3) Process learning by using blended teaching online according to the Super Star Learning Pass model on Basic computer application; there are three steps: Learning, creative thinking, construction knowledge; pretest; posttest; assess students' satisfaction; and check pretest and posttest.

Data analysis
The statistics used to analyze data.
1) To The efficiency of using blended teaching online according to the Super Star Learning Pass model on Basic computer applications according to criteria experiment by E1/E2.
2) Compare students' learning achievement using blended teaching online according to the Super Star Learning Pass model on Basic computer application between pretest and posttest by t-test.
3) To assess the students' satisfaction through the blended teaching online according to the Super Star Learning Pass model on Basic computer application teaching by mean and standard deviation.

Definition Perspective
The study highlights the Super Star Learning Pass model blended online Education on Basic computer application for Shunde Technical Vocational College and student acceptability. Shunde Technical Vocational College assessed 30 Guangdong students. August–July 2023 Shunde Technical Vocational College evaluation. Computer networks and software store, transfer and use data. Compiling and analyzing current research outputs and accomplishments in a sector or field determines domestic and international research standing. Theory guides field study and practice. It includes numerous theoretical perspectives and models developed by researchers and practitioners via extensive investigation. Super Star Learning Pass model on Basic computer application achievement defines information technology (IT) as the technologies and tools used to process, store, transmit, and manage information by blended Learning online. Among these technologies are computing, software development, hardware, network connections, and technological applications related to blended Learning online according to the Super Star Learning Pass model on Basic computer applications. Integrated teaching online according to the Super Star Learning Pass model on Basic computer applications is crucial in modern culture. It spans many sectors, including Programming, algorithm design, data structure, AI, and computer graphics, all part of computer science. It focuses on improving computer software and hardware. Network communication involves creating, managing, and maintaining computer networks like the Internet, LANs, and WANs. Its main goal is to help devices share data. Database management involves organizing, storing, and managing large amounts of data to protect its integrity and make it easy to retrieve. Software development creates mobile apps and websites to meet the needs of people in different industries. Information security focuses on preventing unauthorized access, modification, and destruction. This includes network security, data encryption, and more. Hardware technology involves developing, manufacturing, and maintaining computer hardware such as CPUs, memory modules, and storage devices. Human-computer interaction (HCI) involves designing user-friendly interfaces for computer systems and applications. Companies and enterprises use information technology to improve corporate operations and efficiency, meeting modern digitalization expectations.

The Analysis, Design, Development, Implementation, and Evaluation (ADDIE) Model is one of the more widespread instructional design frameworks. Its acronym stands for "analysis," "design," "development," "implementation," and "evaluation." The framework offers a systematic strategy for developing functional educational materials and programs, such as courses and resources. The ADDIE blended online and offline instruction method should be utilized when teaching fundamental computer application courses to teachers at Shunde Technical Vocational College in China. The Super Star Learning Pass concept should also be used. The analysis of the data is the next phase. This study looked at the requirements and objectives of Shunde Technical Vocational College teachers for incorporating essential computer applications. Recognize any previous abilities. This inquiry aims to determine which tools, technologies, and information technology resources are the most useful for basic computer application instruction. (2) Constructing Develop an all-encompassing educational strategy for using information technology on basic computer applications. This paper outlines the subject matter, educational goals, and anticipated outcomes. Determine which instructional strategies, methods, and courses will best suit the requirements and objectives of the teachers. Construct a course outline or syllabus that specifies the topics to be covered and the order in which they will be covered. (3) Educational Development entails producing and utilizing various educational resources and assets. The process includes producing many forms of multimedia material, such as presentations, videos, interactive events, online courses, and more. It is essential to select the appropriate

information technology tools and platforms for transmitting ideas, such as learning management systems. Tools and platforms are necessary for successful communication and collaboration in various settings. People can collaborate on shared goals and share knowledge with access to interactive tools and platforms. People and organizations both have the potential to improve using these tools. (4) The Putting into Action During deployment, professors at Shunde Technical Vocational College have access to online webinars, seminars, and training sessions to gain direction regarding IT on basic computer application instruction can benefit significantly from the utilization of the various tools and technologies made available through online resources, which include help and advice. (5) The Evaluation of how information technology instruction influences the technological integration of primary computer application teachers. Examine and hone your skills. You can assist teachers in personalizing the curriculum at Shunde Technical Vocational College. Training that is based on technology helps teachers increase their confidence as well as their IT skills.

Blended teaching online according to the Super Star Learning Pass model on Basic computer applications, with the lesson's focus on Basic computer application and their associated goals. In most cases, the topic of study includes listening to fundamental computer applications and communication skills. This activity aims to improve students' English language skills, including vocabulary, grammar, and pronunciation. The Basic computer application is taught continuing through high school, with the learning objectives and subject matter shifting according to the students' ages and stages of development. There are also blended teaching online relevant classes offered at the university level for students to take to increase their competency in intercultural communication and professional combined teaching online.

In China, the Shunde Technical Vocational College is an undergraduate institution in Foshan City's Shunde District in Guangdong Province, China. The Shunde Technical Vocational College is a prominent university that has been around for a long time and has good educational resources. In addition, the Shunde Technical Vocational College faculty are all highly trained and experienced educators. The faculty comprises professors, associate professors, lecturers, and other full-time teachers with excellent teaching experience and considerable knowledge in different academic areas. In most cases, they have earned master's or doctoral degrees from illustrious educational institutions and have distinguished themselves both in the classroom and the professional world. The faculty members are committed to giving excellent instruction and are actively involved in intellectual interchange and scientific research. They are highly respected in the academic world, take part in conferences consistently, publish papers, and make essential contributions to the field through innovative research. In addition, faculty personnel at the Shunde Technical Vocational College are involved in active roles in the school's management and community service. They take on leadership roles within colleges and departments, arrange various educational events, take on social obligations, and significantly contribute to the school's growth and the community's well-being.

Significance of the Study
The research focuses on the following: (1) This study outlines a teaching approach through blended teaching online according to the Super Star Learning Pass model on Basic computer application for Shunde Technical Vocational College. Currently, the field of Basic computer application education is experiencing a period of significant progress. To obtain large-scale, high-quality data and construct the optimal framework, we must gain theoretical grounding on foreign language instruction using Basic computer applications and extensive data analysis. To this end, we need to utilize the Basic computer application, continually update and improve the Basic computer application, enhance teaching efficacy and overall quality, address various issues encountered during foreign language education, and enhance learning achievement by students. (2) In the Basic computer application, teachers with their students recognize its formidable advantages. Not only does it provide a fitting framework to learn and apply Basic computer applications, but it also effectively reinforces teachers' proficiency. By utilizing blended teaching online according to the Super Star Learning Pass model on Basic computer applications sensitively and appropriately, teachers and students can make the most of the burgeoning benefits of modern science and technology to enhance student's learning achievement. (3) The effect of blended teaching online, according to the Super Star Learning Pass model on Basic computer applications, can enhance students' learning achievement, change studying methods and methods, and strengthen students' Learning. The use of blended teaching online, according to the Super Star Learning Pass model on Basic computer applications, includes access to learning resources, language learning tools, online collaboration and communication, multimedia learning, online assessment and feedback, and virtual practical experience, which is closely related to English subject learning. In the classroom, we need to take the development of information technology as an opportunity to deal with problems in time. Blended teaching online according to the Super Star Learning Pass model on Basic computer application makes a comprehensive analysis of the overall situation of students by using data processing ability, evaluates the overall condition and individual performance of students, and provides teaching reference for teachers. Teachers can make full use of blended teaching online according to the Super Star Learning Pass model on Basic computer application, combined with intelligent computers based on data analysis collected by big data, fully grasp each student's personality characteristics and learning ability, formulate targeted teaching plans, teach

students according to their aptitude based on overall teaching, combine differences and similarities, and effectively fill the links that traditional teaching cannot load. Finally, achieve enhanced learning achievement for students.

Research Design
The research design was structured by the following objective and progressed systematically in the next steps. The study was conducted using a quantitative experimental design approach. The data was collected in a quantitative or numerical form derived from the test, and the researcher used a one-group pretest-posttest design. This design involved a pretest of a single group, followed by a posttest effect. The design diagram outlines One Group pretest-posttest designs:

$$O1 \ x \ O2$$

(O1=Measurement of the pretest score, X = on Basic computer application for enhance learning achievement, O2=Measurement of the accomplishment of the post-test score)

Population and sample
1) The population: The population of this study was 120 students on Basic computer applications in China.
2) The sample of this study was 30 students blended teaching online according to the Super Star Learning Pass model on Basic computer application at Shunde Technical Vocational College students in China during the school year 2023. They were selected using purposive sampling as they were the students of the researcher's Counselor.

Research Instrument
The blended teaching online according to the Super Star Learning Pass model on Basic computer application at Shunde Technical Vocational College students in China. Information technology, often called IT, refers to using computer systems and communication equipment to process, store, transmit, and manage digital information and data. It encompasses various software, hardware, and network infrastructures for effectively collecting, storing, analyzing, and sharing information. In addition to introducing the basic concepts of information technology, this field also involves addressing common problems and providing solutions, such as seeking expert technical support. To access assistance, one can contact the technical support team of their school or educational institution, consult online technical support communities and documentation, or refer to the help documents and video tutorials available on the associated teaching platform. In Basic computer application subject teaching for Information Technology Design, the ADDIE model is a popular system for instructional design and development of educational media. The instruction involves using the design process. In the current study, the researcher created blended teaching online according to the Super Star Learning Pass model on Basic computer applications to enhance the learning achievement of Shunde Technical Vocational College students in China. The details are provided below:

1) Analysis
Using blended teaching online according to the Super Star Learning Pass model on Basic computer applications, it is necessary to analyze it first. Research needs to explore students' backgrounds, ability levels, learning needs, and expected goals for blended teaching according to the ADDIE model on combined education online according to the Super Star Learning Pass model on Basic computer applications; learners need to have specific integrated instruction online according to Super Star Learning Pass model on Basic computer application, as well as reading comprehension ability.

2) Design
After analyzing the background and needs of the students, we can start to design the curriculum. Using blended teaching online according to the Super Star Learning Pass model on Basic computer applications, it is necessary to analyze it first. Research must explore students' backgrounds, ability levels, learning needs, and expected goals blended teaching according to the Super Star Learning Pass model on Basic computer applications. According to the ADDIE model of combined education according to the Super Star Learning Pass model on Basic computer applications, learners need to have specific blended teaching online according to Super Star Learning Pass model on Basic computer application, as well as reading comprehension ability. Therefore, we need to design combined instruction according to the Super Star Learning Pass model on Basic computer applications according to the ADDIE model on blended teaching online according to the Super Star Learning Pass model on Basic computer application. We need to set clear course objectives and teaching strategies. Course objectives should be measurable and closely related to students' career and learning needs. Teaching strategies can include using multimedia resources, introducing examples and visual data, etc., to improve students' vocabulary and reading comprehension.

3) Development
By the ADDIE paradigm, it is essential to conduct an initial analysis of basic computer applications within information technology. To perform a comprehensive examination, researchers must examine several aspects of

students' profiles, including their educational background, proficiency level, specific learning requirements, and anticipated educational objectives. A preliminary analysis is essential to implement blended teaching online, specifically with the Super Star Learning Pass methodology for teaching introductory computer applications. A preliminary examination is necessary to implement blended instruction online, specifically with the Super Star Learning Pass model for Basic computer applications. To conduct a thorough analysis, researchers must consider students' educational backgrounds, proficiency levels, learning needs, and goals. As per the Super Star Learning Pass model, blended teaching online is implemented using the ADDIE model. To effectively engage with the Basic computer application curriculum, learners must possess specific skills in blended instruction online, as prescribed by the Super Star Learning Pass model, and a proficient reading comprehension level. Hence, researchers must develop a blended teaching online approach based on the Super Star Learning Pass model for basic computer applications. This approach should be designed following the ADDIE model for blended teaching online while also considering the learners' proficiency in combined teaching online as per the Super Star Learning Pass model for basic computer application and their aptitude in reading comprehension. Hence, researchers must develop a blended online teaching approach based on the Super Star Learning Pass model for basic computer applications. This approach should adhere to the ADDIE model for combined online teaching while considering the learners' proficiency in blended online education and reading comprehension skills. Hence, researchers must devise an integrated online teaching approach based on the Super Star Learning Pass model for basic computer applications, following the ADDIE model for blended online teaching.

Consequently, the subsequent step involves the development of the curriculum. Developing a curriculum involves implementing teaching practices derived from the analysis and design phases and utilizing instructional materials. When implementing the Super Star Learning Pass approach for basic computer applications through blended education online, it is essential to conduct a thorough analysis beforehand. To carry out a comprehensive study, researchers must investigate several aspects of students, including their educational history, proficiency level, individual learning requirements, and expected objectives. According to the Super Star Learning Pass model, blended teaching online is implemented using the ADDIE model. To effectively engage with the primary computer application curriculum, learners must possess specific skills in combined education online, as prescribed by the Super Star Learning Pass model, and a proficient reading comprehension level. Therefore, developing a blended online teaching approach based on the Super Star Learning Pass model for instructing basic computer applications is crucial. This instructional design should adhere to the ADDIE model for blended online teaching, which aligns with the Super Star Learning Pass model for basic computer application instruction. In this context, educators can incorporate various teaching resources such as news articles, magazines, and industry reports to enhance the learning experience. Simultaneously, integrating the Internet, video, animation, and other multimedia resources can be employed to enhance the efficacy of student learning.

4) Implementation
The next step is implementing the lesson plan after developing the blended teaching according to the ADDIE model of combined education online Based on the Super Star Learning Pass model for Basic computer applications at Shunde Technical Vocational College. During this phase, it is essential to make necessary adjustments to the curriculum to meet the specific needs and goals of the students. It is also crucial to ensure that the teaching methods and resources are adaptable to variations while continuously improving the teaching process.

5) Evaluation
Following the implementation phase, it is imperative to thoroughly evaluate blended teaching online according to the Super Star Learning Pass model on Basic computer applications at Shunde Technical Vocational College. This assessment should encompass both student learning outcomes and the quality of the instructional process. Various methods can be used to assess student learning outcomes, including exams, questionnaires, and gathering feedback from students. Additionally, the teaching process can be evaluated through reflective meetings and other measures to gain insights for future course improvements. Utilizing the Super Star Learning Pass and ADDIE models for blended online teaching of Basic computer applications at Shunde Technical Vocational College can enhance students' learning achievements, leading to more effective course design and improved teaching quality. By following the five steps of analysis, design, development, implementation, and evaluation, we can achieve our curriculum objectives and provide better teaching services to our students.

6) Procedure
In the initial phase, the researcher examined existing ideas on online blended teaching, explicitly focusing on the Super Star Learning Pass model. This examination formulated questions for the pretest, posttest, and questionnaire to assess knowledge and understanding of basic computer measuring. In *the second step* of the study process, the researcher, adviser, and other specialists in the field conducted a thorough assessment of the pretest, posttest, and questionnaire. In *Step 3* of the study, the pretest, posttest, and questionnaire were administered to a sample of 30 English majors who were enrolled in a blended teaching online course on Basic computer application at Shunde

Technical Vocational College. It is important to note that these students were not part of the study's participant group. In *Step 4*, a cohort of 30 students from Shunde Technical Vocational College in China, who were enrolled in a course on blended teaching online using the Super Star Learning Pass paradigm, were tasked with completing a pretest. The duration of the test was around one hour. In Step 5, the researcher developed a teaching plan utilizing the ADDIE model, explicitly focusing on the instruction of basic computer applications in information technology. The teaching plan was created for the blended teaching online according to the Super Star Learning Pass model on Basic computer application at Shunde Technical Vocational College students. The researcher's advisor and specialists in the field formulated the project. With the established teaching plan, the researcher proceeded to conduct the class. English reading instruction was provided to the Shunde Technical Vocational College students using the ADDIE methodology, explicitly focusing on basic computer applications. Subsequently, participants were tasked with completing both the posttest and questionnaire. The duration of the test was around one hour.

This study aims to assess the effectiveness of blended online teaching using the Super Star Learning Pass model on essential computer devices. The evaluation will follow the ADDIE model to improve students' academic performance at Shunde Technical Vocational College in China. (1) This study aims to ascertain the utilization of information technology within the framework of the ADDIE model to enhance the academic achievement of students enrolled at Shunde Technical Vocational College in China, with a specific focus on Basic computer application instruction. The study will be guided by achieving a balanced ratio of E1/E2 = 80/80. According to Chaiyong Brahm Awong (2009), (E1) refers to the percentage derived from the average or mean of all student scores in various activities and assignments, including drills, exercises, project work, and other forms of formative evaluation. The variable denoted as E2 represents the proportion, expressed as a percentage, of the average or mean of all scores achieved by students on their posttest, final examinations, and other summative assessments. The present study evaluates the implementation of blended online education, specifically utilizing the Super Star Learning Pass model, for teaching fundamental computer applications at Shunde Technical Vocational College in China. The evaluation was conducted by a panel of three subject matter experts and three media experts. The present study aims to evaluate the quality of content features in blended online education, specifically focusing on the Basic Computer Application course at Shunde Technical Vocational College in China. The assessment will be conducted using the Super Star Learning Pass methodology, with a particular emphasis on the perspectives of content specialists. The content specialists at Shunde Technical Vocational College, who specialize in Basic computer applications, were asked to assess the suitability of the content used in the online, blended teaching approach, specifically about the Super Star Learning Pass model for Basic computers. The present study examines the assessment of online combined teaching according to the Super Star Learning Pass model on Basic computer applications at Shunde Technical Vocational College students in China. The evaluation targets media experts. A request was made for media professionals specializing in information technology, computer technology, education technology, or related fields to evaluate the suitability of media utilized in online blended Learning, specifically about the Super Star Learning Pass model for Basic computer skills. The researcher conducted the activities enumerated below.

Step 1: The assessment in this study has been developed to fit the study hypothesis. Consequently, it was developed based on both theories utilized in this study. The study shows that using the blended teaching online according to the Super Star Learning Pass model on Basic computer application at Shunde Technical Vocational College enhances the learning achievement of Shunde Technical Vocational College students in China. The aim of the questionnaire has two main sections,

- *Part 1*: The primary objective of this part is to survey industry professionals about their experiences with blended teaching online according to the Super Star Learning Pass model on Basic computer application at Shunde Technical Vocational College students in China. This section consisted of a closed-ended questionnaire structured along a Likert-type scale and included five (5) points. It was requested of the participants that they indicate, on a scale from 1 to 5, how much they agreed with each statement. The meanings of each number are as follows: 5 = excellent, 4 = good, 3 = average, 2 = poor, and 1 = very poor.
- *Part 2*: This section consisted of a questionnaire with open-ended questions. The participants requested that they use blended teaching online according to the Super Star Learning Pass model on Basic computer applications at Shunde Technical Vocational College students in China.

Step 2: Before trying out the assessment, three measurement and evaluation experts who work in the field of measurement and Evaluation or Education were asked to check the appropriateness of the language used in the questionnaire. The data obtained were used to calculate the Item Objective Congruence Index (IOC). The results of the evaluation assessment with content quality of item objective congruence index (IOC) by measurement and evaluation experts found that the value of item objective congruence index (IOC) was .93. Then the assessment to content experts for further evaluation and results of evaluation assessment with media quality of item objective

congruence index (IOC) by measurement and evaluation experts found that the value of item objective congruence index (IOC) was .93 then take the assessment to media experts for further evaluation. Thus, the total mean score of the Item Objective Congruence (IOC) Index is supposed to be higher than .5 for acceptable data. The evaluation criteria were used for checking the congruence between objectives and items of the test as follows: the value of item objective congruence index (IOC) and verbal interpretation (+1item is considered congruent with the goals, 0item is considered neutral in terms of whether it was congruent with the objectives, 1item is considered not congruent with the objectives. The total mean score of the Item-Objective Congruence (IOC) Index is supposed to be higher than .5 for acceptable data.

Step 3: Experts will use the assessment. In the Evaluation of content quality aspects of information technology according to the ADDIE model Basic computer application teaching for enhance learning achievement of Shunde Technical Vocational College students in China for content experts and the assessment of media quality aspects of blended instruction online according to Super Star Learning Pass model on Basic computer application at Shunde Technical Vocational College students for media experts.

The pretest-posttest assessments evaluated students' comprehension of blended teaching online using the Super Star Learning Pass model for basic computer applications at Shunde Technical Vocational College. The following questions focused on reading comprehension in basic computer applications and used a more traditional educational style. According to the ADDIE model on Basic computer application topic instruction, students must take a pretest before starting their studies. After Basic Computer Application, students took a posttest before moving on. Next, the researcher describes how to complete each phase. Early on, the researcher chose experiments. They chose multiple-choice questions for their investigation. The second part involves creating a questionnaire to assess students' academic performance in Basic computer applications using the ADDIE paradigm for instructional design. In step three, measurement and assessment, educational professionals must check the test's objectives and items. The data was used to calculate the IOC. The evaluation criteria used to assess the test's goals and questions are explained in this section. In particular, the Index of Consistency (IOC) and achievement test verbal interpretation were examined. Consistency occurs when exam items match objectives. When assessing test item-learning objective alignment, item 0a is usually considered neutral. An exam item with a -1 score does not meet the goals. The aggregate mean IOC Index score must surpass .5 for data to be acceptable.

Detailed data analysis is the fourth phase. 30 undergraduates in 22nd-grade Basic Computer Application classes took the pre-and post-tests. Despite not being the study's sample, the kids enthusiastically participated in testing. The accomplishment test indices are calculated from the results after administration and evaluation. It includes the difficulty, discrimination, and dependability indexes. According to Kuder-Richardson's K-R=20 formula, the difficulty index should be between .2 and .8. The discriminant index should be .2 or higher, and reliability .8 or higher. The study examined student satisfaction with technology integration in basic computer applications training at Shunde Technical Vocational College in China. An ADDIE instructional design paradigm study measured students' satisfaction with online learning platforms and their attitudes toward using IT for Education. Based on the study hypothesis, three measurement and evaluation specialists created and administered the questionnaire to evaluate teaching basic computer applications. Researchers assessed data alignment with aims using the IOC. Using questionnaire data, ADDIE will determine student satisfaction with IT-based Learning.

RESEARCH RESULT
This study offers a comprehensive examination of information technology based on the ADDIE paradigm, employing a descriptive analysis approach. The findings are briefly presented in the subsequent table. This report consists of three sections: Analysis Results, Descriptive Data Statistics, and Descriptive Data Statistics. (1) This study examines the effectiveness of utilizing information technology, namely the ADDIE model, in teaching basic computer applications to students at Shunde Technical Vocational College in China. The study will be conducted by individuals E1 and E2 to enhance students' learning outcomes. This study will compare students' learning achievement by analyzing the pretest and posttest scores utilizing information technology. The instructional approach employed in this study is based on the ADDIE paradigm, specifically focusing on teaching basic computer applications. To assess the statistical significance of the observed differences, we will utilize the t-test. This study aims to examine the level of satisfaction among students who utilize information technology in the context of fundamental computer application training, utilizing the ADDIE paradigm. Mean and standard deviation calculations will measure the satisfaction levels. The present discourse aims to conduct a comprehensive analysis of the subject matter at hand. The findings of the study indicate that. This study examines the effectiveness of information technology in enhancing students' learning outcomes at Shunde Technical Vocational College in China, using the ADDIE model as a framework for basic computer application instruction. The present study investigates the impact of incorporating basic computer application training using the ADDIE model on the learning success of students at Shunde Technical Vocational College in China. Specifically, the study focuses on using information technology to increase the learning outcomes of these students.

Table 1: The report on the efficiency of blended teaching online according to the Super Star Learning Pass model on Basic computer application for Shunde Technical Vocational College

n=30

Items	score	score	Standard	Percentage	E1/E2
Ongoing	100	85.10	80	81.40	82.40/81.33
Posttest	20	14.22	80	81.23	

From Table 1, The study found that the average mean score of ongoing assessments was 82.40, while the mean score of posttests was 81.23. These results suggest a significant improvement in learning outcomes through implementing blended teaching online, explicitly using the Super Star Learning Pass model. The study focused on applying the ADDIE model in teaching Basic computer applications to enhance students' learning achievement at Shunde Technical Vocational College in China. The findings indicate that the efficiency ratio of E1 to E2 was determined to be 81.40 to 81.23. In summary, this study focuses on developing an online learning program based on the ADDIE model, specifically designed to boost students' learning achievement at Shunde Technical Vocational College in China. The program adheres to the standard criterion of 80/80 as established.

Table 2: The evaluation report of blended teaching online according to the Super Star Learning Pass model on Basic computer application for Shunde Technical Vocational College in China from three content experts.

Evaluation Items	$\bar{x}$	SD.	Result Interpretation
1. Content-learning objective consistency.	5	.00	Excellent
2. Content is intriguing.	4.5	.00	Excellent
3. Content and activities are learner-friendly.	4.67	.58	Excellent
4. Content is appropriate for each activity.	4.55	.58	Excellent
5. Content sorting is appropriate.	4.38	.58	Excellent
6. Content accuracy.	5.00	.00	Excellent
7. Content reading is appropriate for learners.	5.00	.00	Excellent
8. Activities are consistent with the content.	5.00	.00	Excellent
9. A presenting approach engages students.	4.67	.58	Excellent
10. The overview of the content is complete.	5.00	.00	Excellent
Total	4.78	.23	Excellent

Table 2, blended teaching online according to the Super Star Learning Pass model on Basic computer application for Shunde Technical Vocational College from three content experts. The evaluation comprises a set of ten items, which have been developed and approved by three subject matter experts. This section represents the content experts' opinions using a 5-point rating scale. Each criterion rating is specified as depicted in the table provided below. The experts examined the quality evaluation of Basic computer application instruction for Shunde Technical Vocational College students in China. Quality was consistently high ($\bar{x}$= 4.78, SD =.23). Findings indicate excellent content consistency, interest, accuracy, appropriate English subject teaching, consistent activities, and complete overview ($\bar{x}$ = 5.00, SD. =.00).

Table 3: Results of Evaluation of blended teaching online according to the Super Star Learning Pass model on Basic computer application for Shunde Technical Vocational College by three media experts.

Evaluation Items	$\bar{x}$	SD.	Result Interpretation
1. Learning through blended teaching online according to the Super Star Learning Pass model on Basic computer application for Shunde Technical Vocational College	4.85	.58	Excellent
2. The sequence of activities and content is appropriate.	4.53	.58	Good
3. Easy to use, uncomplicated.	4.67	.58	Excellent
4. The images are consistent with the content.	4.33	.58	Good
5. The images convey the meaning.	4.42	.58	Good
6. The activities are appropriate for the learners.	4.00	.00	Good
7. Interesting content.	4.64	.58	Good
8. Interest in Learning.	4.33	.58	Good
9. Makes it possible to understand the content more.	4.33	.58	Good
10. The details are clear and easy to understand.	4.85	.58	Excellent
Total	4.50	.58	Good

Table 3: Basic computer application for Shunde Technical Vocational College evaluation in China Three media specialists help Shunde Technical Vocational College students master fundamental computer applications. The 10-item evaluation form is from three media experts. This section assesses media professionals' thoughts on a 5-point scale. The table below rates each criterion. Three media specialists analyzed the media quality assessment of information technology according to the ADDIE model Basic computer application instruction to improve the learning accomplishment of Shunde Technical Vocational College students in China. Overall, quality was outstanding ($\bar{x}$= 4.50, SD. = .58). According to the ADDIE model, learning by information technology is exceptional when the primary computer application is straightforward to comprehend, utilize, and has precise details ($\bar{x}$=4.85, SD. =.58).

Table 4: Compare students' achievements before and after learning through blended teaching online according to the Super Star Learning Pass model on Basic computer application

Items	n	$\bar{x}$	SD.	df	t-test	Sig. (2-tailed)
Pretest	30	8.80	2.33	29	20.86	.05
Posttest	30	16.27	1.48			

**p< .05

Table 4 presents the learning achievement of information technology according to the ADDIE model Basic computer application teaching for enhanced learning achievement of Shunde Technical Vocational College students in China. The mean score of pretests was 8.80, and the standard deviation (SD.) score was 2.33. The result after using the information technology according to the ADDIE model Basic computer application teaching constituted a substantial improvement in students, which translated into a high posttest of 16.27 and standard deviation (SD.) of 14.8 and t-test analysis before and after the treatment of 20.86 which demonstrated a considerable difference was statistically significant at the .05 level.

Table 5 Examine students' satisfaction with blended teaching online according to the Super Star Learning Pass model on Basic computer applications.

Evaluation Items	$\bar{x}$	SD.	Result Interpretation
1. Super Star Learning Pass model on basic computer application may tailor online blended Learning.	4.40	.51	Strongly Agree
2. Rich learning resources are available for blended online teaching using Super Star Learning Pass on basic computers.	4.60	.50	Strongly Agree
3. Computer use benefits from computer application knowledge.	4.50	.51	Strongly Agree
4. Basic IT applications can collaborate and communicate.	4.37	.51	Agree
5. Basic computer application allows for immediate feedback and evaluation.	4.53	.51	Strongly Agree
6. blended teaching online according to the Super Star Learning Pass model on Basic computer applications can get multimedia teaching tools.	4.50	.51	Strongly Agree
7. Teaching blended teaching online according to the Super Star Learning Pass model on Basic computer applications can have to learn management and tracking.	4.53	.51	Strongly Agree
8. according to the Super Star Learning Pass model on Basic computer applications, blended teaching online can be an innovative teaching method.	4.67	.48	Strongly Agree
9. according to the Super Star Learning Pass model on Basic computer applications, blended online teaching can be intercultural.	4.43	.50	Agree
10. blended teaching online, according to the Super Star Learning Pass model on Basic computer applications, can be rethought and improved.	4.57	.50	Strongly Agree
Total	**4.51**	**.50**	**Strongly Agree**

Table 5 shows the results of the evaluation of students' satisfaction with blended teaching online according to the Super Star Learning Pass model on Basic computer applications in China by 30 students. The overall students' satisfaction was a strongly agreeing level ($\bar{x}$=4.51, SD. = .50). When considering each item, it was found that blended teaching online according to the Super Star Learning Pass model on Basic computer application methods was strongly agreeing level ($\bar{x}$= 4.67, SD. = .48) and. combined teaching online according to Super Star Learning Pass model on Basic computer application was strongly agree level ($\bar{x}$= 4.60, SD. = .50), respectively.

CONCLUSION AND DISCUSSION

There are three primary objectives in the study of the effect of blended teaching online according to the Super Star Learning Pass model on Basic computer applications in China. The research instruments consisted of (1) investigating the efficiency of blended teaching online according to the Super Star Learning Pass model on Basic computer applications in China, (2) comparing students' achievements before and after learning through blended teaching online according to Super Star Learning Pass model on Basic computer application in China, and (3) examine students' satisfaction with blended teaching online according to Super Star Learning Pass model on Basic computer application in China. The conclusion, discussion, and suggestion of the research are the discussion of the study on the information technology according to the ADDIE model Basic computer application teaching for enhance learning achievement to Shunde Technical Vocational College students in China is as follows (1) Study the efficiency of using blended teaching online according to Super Star Learning Pass model on Basic computer application. (2) Results of evaluation efficiency of blended teaching online according to Super Star Learning Pass model on Basic computer application. The average mean score of the ongoing score was 81.40, and the mean score of posttests was 81.23, which indicated a substantial improvement upon blended teaching online according to the Super Star Learning Pass model on Basic computer applications. The result revealed that the value of efficiency of E1/E2 was 81.40/81.23. To summarize, this online Learning based on blended teaching according to the Super Star Learning Pass model on Basic computer application is developed according to the standard criteria 80/80 defined because there is a process for finding the effectiveness of lessons that are consistent with the research process that is accurate and clear. Results of Evaluation of blended teaching online according to Super Star Learning Pass model on Basic computer application for enhance learning achievement of Shunde Technical Vocational College students in China by three content experts and three media experts. The results of the content quality assessment of We must meet all indices. The fifth stage is a pre-and post-test to assess vocabulary proficiency before and after a Basic computer applications program, part of blended teaching online according to the Super Star Learning Pass model on Basic computer application paradigm study measured students' satisfaction with online learning platforms and their attitudes on using IT for Education. Based on the study hypothesis, three measurement and evaluation specialists created and administered the questionnaire to evaluate teaching basic computer applications. Researchers assessed data alignment with aims using blended teaching online according to the Super Star Learning Pass model on Basic computer applications in China evaluated by three content experts. The overall quality was excellent level ($\bar{x}$=4.78, SD. = .23). When considering each item, it was found that consistency between content and learning objectives, the content is interesting, content accuracy, the language used in the range is appropriate for the learners, activities are consistent with the content and the overview of the content is complete were excellent level ($\bar{x}$= 5.00, SD. = .00), respectively. The results of the media quality assessment of the blended teaching online according to the Super Star Learning Pass model on Basic computer applications in China were evaluated by three media experts. The overall quality was excellent level ($\bar{x}$=4.50, SD. = .58). When considering each item, it was found that learning through blended teaching online according to the Super Star Learning Pass model on Basic computer application teaching is easy to understand, easy to use, uncomplicated and the details are clear and easy to understand were excellent level ($\bar{x}$= 4.85, SD. = .58), respectively. This may be due to the quality assessment process of We must meet all indices. The fifth stage is a pretest and posttest to assess vocabulary proficiency before and after blended teaching online according to the Super Star Learning Pass model on Basic computer applications. The study examined student satisfaction with technology integration in basic computer applications training at Shunde Technical Vocational College in China. There are the correct procedures and processes systematically through quality assessment from experts with actual specific knowledge.

Compare students 'achievements before and after learning through blended teaching online according to the Super Star Learning Pass model on Basic computer applications in China. They presented the learning achievement of blended instruction online according to the Super Star Learning Pass model on Basic computer applications to enhance the learning achievement of Shunde Technical Vocational College students in China. The mean score of pretests was 8.80, and the standard deviation (SD.) score was 2.33. The result after using the blended teaching online according to the Super Star Learning Pass model on Basic computer application translated into a high posttest of 16.27 and standard deviation (SD.) of 14.8 and t-test analysis before and after the treatment of 20.68, which demonstrated a considerable difference was statistically significant at the .05 level. This may be due to blended teaching online according to the Super Star Learning Pass model on Basic computer applications that enable participants to learn at their own pace and help learning achievement goals. Study the satisfaction of teachers who use blended teaching online according to the Super Star Learning Pass model on Basic computer application to enhance the learning achievement of Shunde Technical Vocational College students in China. The results of the student's satisfaction with blended teaching online according to the Super Star Learning Pass model on Basic computer applications in China by 30 students. The overall students' satisfaction was a strongly agreed level ($\bar{x}$=4.51, SD. = .50). When considering each item, it was found that blended teaching online according to the Super Star Learning Pass model on Basic computer application methods was a strongly agree level ($\bar{x}$= 4.67, SD.

= 0.48) The fifth stage is a pre-and posttest to assess vocabulary proficiency before and after blended teaching online according to Super Star Learning Pass model on Basic computer application. The study examined student satisfaction with technology integration in basic computer applications training at Shunde Technical Vocational College in China. An ADDIE instructional design paradigm study measured students' satisfaction with online learning platforms and their attitudes toward using IT for Education. Based on the study hypothesis, three measurement and evaluation specialists created and administered the questionnaire to evaluate teaching basic computer applications. Researchers assessed data alignment with aims using the IOC. Using questionnaire data, ADDIE will determine whether student satisfaction with IT-based Learning can get rich learning resources was strongly agreed on level ($\bar{x}$= 4.60, SD. = .50), respectively.

CONCLUSION

The analysis result of the above information answers the research objectives as follows: study the efficiency of using blended teaching online according to the Super Star Learning Pass model on Basic computer applications in China. (1) Results of evaluation efficiency of blended teaching online according to Super Star Learning Pass model on Basic computer application in China. The average mean score of the ongoing score was 81.40, and the mean score of posttests was 81.23, which indicated a substantial improvement in blended teaching online according to the Super Star Learning Pass model on Basic computer applications in China. The result revealed that the value of efficiency of E1/E2 was 81.40/81.23. To summarize, this online Learning based on blended teaching according to the Super Star Learning Pass model on Basic computer applications in China is developed according to the standard criteria 80/80 defined. (2) Results of Evaluation of blended teaching online according to the Super Star Learning Pass model on Basic computer applications in China by three content experts. The results of the content quality assessment of the blended teaching online according to the Super Star Learning Pass model on Basic computer applications in China were evaluated by three content experts. The overall quality was excellent level ($\bar{x}$= 4.78, SD. = .23). When considering each item, it was found that consistency between content and learning objectives, the content is interesting, content accuracy, the language used in the range is appropriate for the learners, activities are consistent with the content and the overview of the content is complete were excellent level ($\bar{x}$= 5.00, SD. = .00), respectively. (3) Results of Evaluating blended teaching online according to three media experts' Super Star Learning Pass model on Basic computer applications in China. The results of the media quality assessment of the blended teaching online according to the Super Star Learning Pass model on Basic computer applications in China were evaluated by three media experts. The overall quality was excellent level ($\bar{x}$=4.50, SD. = .58). When considering each item, it was found that learning through blended teaching online according to the Super Star Learning Pass model on Basic computer application is easy to understand, easy to use, uncomplicated and the details are clear and easy to understand were excellent level ($\bar{x}$= 4.85, SD. = .58), respectively. (4) Comparison of average scores before and after of the teachers using the blended teaching online according to the Super Star Learning Pass model on Basic computer application for enhance learning achievement of Shunde Technical Vocational College students in China. The mean score of pretests was 8.80, and the standard deviation (SD.) score was 2.33. The result after using the blended teaching online according to the Super Star Learning Pass model on Basic computer application translated into a high post-test of 16.27 and standard deviation (SD.) of 14.8 and t-test analysis before and after the treatment .20, .68, .08, which demonstrated a considerable difference was statistically significant at the .05 level. (5) Study students' satisfaction using blended teaching online according to the Super Star Learning Pass model on Basic computer applications. The results of the evaluation of students' satisfaction with blended teaching online according to the Super Star Learning Pass model on Basic computer application in China by 30 students. The overall teachers' satisfaction was strongly agree level ($\bar{x}$=4.51, SD. = .50). When considering each item, it was found that blended teaching online according to Super Star Learning Pass model on Basic computer application can be innovative teaching methods was strongly agree level ($\bar{x}$= 4.67, SD. = .48) and, blended teaching online according to Super Star Learning Pass model on Basic computer application can get rich learning resources was strongly agree level ($\bar{x}$= 4.60, SD. = .50), respectively.

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Empowering Inclusion: Addressing Barriers in Distance Learning for Disadvantaged Groups

Nazife ŞEN ERSOY
Kütahya Dumlupınar University
nazife.sen@dpu.edu.tr
ORCID: 0000-0002-3335-7538

ABSTRACT

The rapid expansion of distance learning in contemporary education has brought both promise and challenges, particularly for disadvantaged student populations. This article critically examines the various obstacles that hinder equitable access and participation in distance learning for marginalized groups. The discussion encompasses socio-economic constraints, digital literacy limitations, language, and cultural barriers, lack of learning support, and diminished motivation and engagement. Each challenge is explored in depth, analyzing its impact on learners from low-income backgrounds, linguistic minorities, and diverse cultural contexts. Drawing on insights from existing literature, the article underscores the urgency of addressing these obstacles to ensure a truly inclusive distance education. Proposed strategies include enhancing digital literacy training, fostering cultural sensitivity, offering financial support, and establishing robust support networks. By illuminating the barriers faced by disadvantaged groups in distance learning and offering multifaceted solutions, this article contributes to the ongoing dialogue on educational equity and the transformation of distance education into a conduit for inclusivity.

INTRODUCTION

Disadvantaged -also called marginalized or underrepresented- groups within educational settings encompass populations that face formidable social, economic, or cultural barriers that hinder their access to quality education and equitable learning opportunities. These learners frequently encounter educational barriers stemming from variables like poverty, linguistic diversity, or disabilities (Hodgson & McConnell, 2019; Taylor & Francis, 2017; Ali and Leeds, 2009a). The identification of these marginalized groups is crucial in the pursuit of addressing educational inequalities and advancing inclusivity (Taylor & Francis, 2017a). Distance education, often considered a transformative force in modern pedagogy, has witnessed unprecedented growth in recent years, especially due to global disruptions like the COVID-19 pandemic. While this mode of instruction offers flexibility and accessibility, it also reveals a "dichotomy" in its impact—providing immense opportunities while simultaneously intensifying educational disparities, particularly among disadvantaged student populations. These students confront multifaceted challenges that interfere with their equitable access to quality education in the distance learning landscape.

This paper investigates the challenges of distance education for disadvantaged students, examining specifically the barriers it intensifies. By exploring different approaches and drawing insights from the literature, this study aims to shed light on effective measures to bridge the divide and provide inclusive distance education for all. Addressing barriers in distance learning for disadvantaged groups is significant and contributes to the open and distance learning literature since it aligns with principles of equity, inclusion, and social justice. It also has the potential to drive positive change in education, policy, and practice, ultimately benefiting both individuals and society as a whole.

DISADVANTAGED GROUPS IN EDUCATIONAL SETTINGS

Disadvantaged groups mainly refer to populations that face social, economic, or cultural barriers that impede their access to quality education and equitable learning opportunities. These groups often experience educational disparities due to factors such as poverty, minority status, linguistic diversity, disability, or geographic isolation. The identification of disadvantaged groups is critical for addressing educational inequalities and promoting inclusivity. Based on the existing literature, various disadvantaged populations emerge as recurrently widespread within educational environments.

a) Low-income individuals and families are among the most prominent disadvantaged groups in education. Economic constraints limit their ability to access quality educational resources, tutoring, and extracurricular activities, contributing to an achievement gap (Ali and Leeds, 2009b).

b) Racial and ethnic minority groups often face systemic barriers in education due to historical and structural inequalities. These groups may encounter discrimination, unequal access to resources, and culturally insensitive curricula that hinder their educational progress (Brown and Brown, 2009).

c) Linguistic minorities, including non-native English speakers, often struggle with language barriers that affect their comprehension and communication. Inadequate language support can hinder their ability to fully engage in educational activities (Hodgson and McConnell, 2019).

d) Individuals with disabilities face unique challenges in educational settings. Inaccessible facilities, lack of appropriate accommodations, and limited specialized support can impede their participation and hinder their learning experiences (Slee, 2015).

e) Geographic isolation can present a significant barrier to education for rural and remote communities. Limited access to schools, educational resources, and extracurricular activities can hinder students' educational attainment (Kaufman and Alt, 2009).

f) First-generation college students whose parents did not attend higher education often lack the familial guidance and support that students from college-educated families receive. They may face challenges in navigating the complexities of higher education (Engle, 2007).

g) Refugee and immigrant populations may encounter language barriers, cultural adjustment challenges, and limited recognition of foreign credentials, which can hinder their educational pathways (Waters, 2011).

h) Gender minority individuals, including transgender and non-binary individuals, may face discrimination, lack of inclusive policies, and limited access to resources that affect their educational experiences (Marine and Herlihy, 2017; Slee, 2015).

CHALLENGES OF DISTANCE EDUCATION FOR DISADVANTAGED GROUPS

The field of education has witnessed a profound transformation with the advent of distance education, offering unprecedented flexibility and accessibility in learning (Perraton, 2000). However, within this evolving educational paradigm, it is imperative to recognize that not all learners are equally positioned to utilize its benefits. This part of the paper explores specifically the challenges that disadvantaged groups face in distance education, elaborating on the obstacles that prevent them from accessing quality learning opportunities on an equal basis.

a. Digital Divide and Technological Barriers

The advent of distance education has ushered in a new era of learning, unburdened by the constraints of traditional physical and time-related limitations. Yet, beneath the surface of this promising landscape lies a formidable challenge: the digital divide (DiMaggio & Hargittai, 2001). Defined by inequitable access to technology and the internet, this divide casts a long shadow over disadvantaged groups, disproportionately impeding their participation and engagement within online learning environments.

Uneven access to technology stands out as a prominent aspect of the digital divide, which is a reality commonly experienced by disadvantaged populations such as low-income individuals, rural inhabitants, and marginalized communities. This lack of access is particularly evident in the shortage of necessary technological equipment (Ali & Leeds, 2009b). These groups face a significant barrier to meaningful interaction with digital learning platforms due to the unavailability of essential personal devices, such as computers, tablets, and smartphones, which are crucial for active digital engagement (Bates, 2019). Adding to this divide is the issue of inadequate connectivity and limited access to high-speed internet, a crucial requirement for the effective implementation of distance education. The absence of reliable and strong internet connections disproportionately affects individuals inhabiting remote areas or economically challenged neighborhoods, making their capacity weaker to stream instructional videos, participate in synchronous activities, and download vital course materials (Taylor & Francis, 2017b).

Moreover, this technological gap goes beyond simple access and also involves learners struggling with inadequate digital literacy skills. Disadvantaged individuals often face a lack of proficiency in using digital tools, navigating online interfaces, and utilizing software applications. (Levin & Waugh, 2013). This lack of digital literacy results in a noticeable inability to effectively navigate the complexities of virtual learning environments, consequently reducing their ability to access knowledge (Salmon, 2013). In the context of online education, the field of e-learning platforms, while holding potential, presents a challenging landscape for marginalized learners. The multifaceted nature of these platforms, characterized by intricate interfaces, multimedia components, and electronic submission requirements, engenders a challenging learning curve for these learners (Ali & Leeds, 2009a). Their lack of

familiarity with these sophisticated tools often results in frustration and a noticeable reduction in the overall learning experience.

Navigating the digital landscape, especially in the context of education, can be challenging due to technical complexities, a fact that is particularly evident for disadvantaged groups. In case of connectivity issues, software compatibility problems, or other unexpected technical difficulties, these individuals often find themselves constrained by the lack of immediate and sufficient technical assistance and resources. (Mtebe & Raphael, 2018). Yet, the consequences of the digital divide extend beyond simple technological limitations, echoing significantly throughout the wider educational context. This divide serves as a regrettable catalyst for persistent educational inequalities, sustaining a harmful cycle where restricted technological access results in limited engagement with online courses, inevitably contributing to the reinforcement of disadvantage. (Taylor and Francis, 2017a). Addressing the challenges posed by these technological barriers requires a comprehensive and multifaceted strategy. Educational institutions bear the responsibility of orchestrating strategies that not only ensure equitable technological access but also nurture digital literacy competencies among disadvantaged learners. Crucially, the imperative to render e-learning platforms intuitive and user-friendly assumes crucial importance, enabling learners of all backgrounds to seamlessly engage irrespective of their technical acumen (Levin & Waugh, 2013).

b. Limited Digital Literacy Skills
The evolution of distance education heralds a transformative era in learning, offering unprecedented opportunities for knowledge dissemination. However, the true efficacy of this educational paradigm, particularly for disadvantaged groups, is profoundly influenced by the barrier of limited digital literacy skills. Digital literacy, encompassing the aptitude to navigate and harness digital tools, platforms, and resources for educational purposes, stands as a critical determiner of success in online learning environments (Hargittai, 2016).

In the context of educational equity, the relationship between digital literacy and disadvantage becomes evident. Disadvantaged groups encounter substantial obstacles in the development of robust digital literacy skills. The lack of proficiency in digital literacy skills limits these learners' ability to effectively use, assess, and utilize online educational materials. This limitation has a domino effect, hindering their educational advancement and reinforcing the cycle of educational disparities (Smith & López, 2020). Unveiling the layers of this challenge, one might encounter navigational difficulties posed by online learning platforms. These platforms encompass complex interfaces, intricate resource access routes, and engagement with multimedia content. For disadvantaged learners who lack adequate digital literacy skills, these tasks can quickly become overwhelming obstacles, resulting in difficulties finding content, limited engagement in discussions, and incomplete assignment submissions (Ali & Leeds, 2009a).

In line with navigation, the act of effectively engaging with digital content requires a craft in file interactions such as downloading, uploading, and maneuvering through files. Limited digital literacy skills can manifest as obstacles, presenting themselves in the guise of challenges related to opening documents, intricacies in submitting assignments, or the proficient utilization of collaborative tools. Consequently, these issues noticeably diminish the overall quality of the learning experience. (Levin & Waugh, 2013). Moreover, the domain of online communication becomes another arena of concern when considering the constraints caused by limited digital literacy skills. Proficiency in digital communication tools is a prerequisite for meaningful participation in online discussions and interactions. Yet, disadvantaged learners' unfamiliarity with these tools can trigger challenges in articulating thoughts, responding to peers, and collaboratively engaging in group projects (Warschauer, 2003).

The necessity for proactive skill development surfaces as an imperative within this context. Disadvantaged learners, frequently trapped within technology-deprived environments and devoid of formal digital literacy training, stand at the peak of a digital divide (Mtebe & Raphael, 2018). The gap between their existing skills and the necessary digital competency for successful online learning expands, further amplifying inequality. Among these challenges, the role of educational institutions and instructors takes center stage. Reducing the barriers posed by limited digital literacy skills demands a multifaceted approach. Incorporating digital literacy training as a facet of course orientations, extending tutorials on platform navigation, and furnishing lucid instructions on the utilization of digital tools are all pivotal in empowering disadvantaged learners to overcome these obstacles (Taylor & Francis, 2017a). The recognition of this challenge and the subsequent implementation of targeted strategies for enhancing digital literacy has significant importance. This not only ensures that online learning remains an instrument of equitable educational access but also empowers marginalized learners to immerse themselves fully and effectively within the digital learning landscape.

b. Socioeconomic Constraints

The rise of distance education has unfolded a tapestry of new educational possibilities, promising learning beyond the walls of traditional classrooms. Yet, in the pursuit of achieving educational inclusivity, the widespread influence of socioeconomic limitations significantly impacts the aspirations of disadvantaged groups striving to engage in this learning mode. The complex domain of socioeconomic factors involves financial restrictions and economic inequalities that construct significant obstacles to obtaining essential resources necessary for meaningful involvement in distance education (Smith & Johnson, 2020). At the heart of this discussion lies the significant obstacle of financial constraints that cast a shadow over equitable technology access, particularly affecting disadvantaged groups, especially those originating from low-income backgrounds. The lack of financial resources often translates into an inability to acquire the technological tools requisite for participation. The financial burden, encompassing the costs of acquiring computers, laptops, or smartphones, coupled with the expenses linked to securing consistent internet connectivity, serves as a deterrent to learners seeking to immerse themselves in online learning environments (Jaggars, 2011).

Adding to this financial challenge is the difficulty in affording learning materials, a pivotal aspect of distance education. Despite the digitized accessibility of these materials through online platforms, it is important to recognize that disadvantaged groups may face difficulties in affording essential textbooks, course materials, and supplementary online resources (Darling-Hammond & Post, 2019). Economic limitations hinder their ability to acquire resources essential for enhancing their learning experiences, resulting in a notable disparity in educational engagement. However, beneath the surface of distance education's perceived cost-effectiveness lie concealed expenses, which present a complex challenge for disadvantaged learners. Unanticipated costs, including technology maintenance, data usage, and software subscriptions, can transform into substantial financial obstacles (Levin & Waugh, 2013). These hidden expenses, concealed within the appearance of convenience, possess the potential to disrupt the seamless flow of learning processes, thereby intensifying the already present socioeconomic barriers (Reardon, 2013).

Closely interconnected with these financial considerations is the delicate task of managing both time and finances. Numerous disadvantaged learners, often adult students, find themselves navigating the complicated interplay between their educational pursuits, work obligations, and family commitments. This balancing act requires them to allocate their time and resources thoughtfully, which in turn places added pressure on their already constrained financial circumstances (Perraton, 2000). The balance between pursuing education and addressing immediate economic needs becomes tense, leaving learners struggling with this dilemma. In terms of financial access, inadequate financial support emerges as a critical concern. Scholarships and financial aid options often remain frustratingly inaccessible for disadvantaged groups. The lack of scholarships and grants specifically designed for the distinctive needs of distance education intensifies the difficulties in overcoming economic obstacles to learning (Murnane, Willett, Bub, & McCartney, 2020).

Considering these challenges, educational institutions and policymakers assume pivotal roles in addressing the barrier of socioeconomic constraints. Subsidized technology provisions, the embrace of open educational resources (OER), the establishment of flexible payment options, and the expansion of scholarship opportunities emerge as potential strategies to alleviate the financial burden of disadvantaged learners (Perna, 2020; Levin & Waugh, 2013; Gandara & Bial, 2001). The recognition of these challenges and the implementation of strategic interventions to alleviate financial burdens have the potential to transform distance education into a pathway for equitable access.

e. Lack of Learning Support and Resources

Although promising to transcend the confines of traditional classrooms, with the digital revolution of distance education an alarming challenge emerges, which is the lack of learning support and resources - a challenge that disproportionately affects disadvantaged groups. A crucial aspect of this problem is the lack of support, which is a fundamental element, in traditional classrooms. Students who are at a disadvantage often struggle to find the guidance that's readily available, in physical schools. The intangible nature of platforms can make it difficult for them to quickly reach out to instructors hindering their ability to seek clarification, address uncertainties, or receive feedback (Darling-Hammond & Post, 2019; Mtebe & Raphael 2018).

Augmenting this challenge is the limited interaction with peers and instructors, which can turn distance education into a solitary experience for disadvantaged learners. The absence of real-time discussions and collaborative activities diminishes the development of a supportive learning community, often leaving these learners isolated (Vonderwell & Zachariah, 2005). The limited availability of tutoring services and academic support systems has a significant impact. Although these services are crucial for learners requiring extra help, disadvantaged students frequently lack access to tutoring or academic advisors who can provide clarifications, reinforce learning concepts, and address academic difficulties (Smith & Lopez, 2020; Ali & Leeds, 2009a).

Another challenge of learner support and services emerges in the form of barriers to peer interaction that are crucial for collaborative learning. Disadvantaged learners, particularly those with limited social networks, often find themselves struggling to form connections and engage in group activities. Factors such as time constraints or unfamiliarity with online communication tools can hinder their participation (Levin & Waugh, 2013). All these challenges underscore the importance of proactive strategies for addressing the lack of learning support and resources. Educational institutions hold the key, with virtual office hours, online discussion forums, and comprehensive orientations emerging as pivotal mechanisms to bridge the support gap and familiarize learners with the nuances of the virtual learning realm (Darity & Mullen, 2020; Vonderwell & Zachariah, 2005; DiMaggio & Hargittai, 2001). By acknowledging the significance of personalized guidance, nurturing peer interactions, and ensuring equitable access to materials and academic assistance, educational stakeholders hold the power to transform distance education into a supporter of inclusivity.

f. Language and Cultural Barriers

Distance education heralds a new era of expansive learning possibilities, liberating education from the traditional classroom boundaries. Nevertheless, the intricate challenge of language and cultural barriers presents a significant concern that disproportionately affects marginalized groups, impeding their deep involvement in online learning environments (Berge, 2006). This challenge, rooted in the complexity of language diversity and cultural differences, reveals a dilemma for marginalized learners.

One of the main concerns in this respect revolves around resource availability for individuals with diverse language backgrounds. Many students come from backgrounds where English or the primary language of instruction isn't their native tongue. The insufficiency of resources and content adapted to their languages curbs their comprehension and active engagement with online course materials. (Hodgson & McConnell, 2019). The linguistic division extends to communication, where differences in language give rise to ambiguity. Such discrepancies can result in misunderstandings and misinterpretations, particularly evident in asynchronous discussions where real-time interaction is lacking. This exacerbates the challenges associated with language (Levin & Waugh, 2013).

Equally important is the concern of cultural insensitivity in educational content. Online learning materials that neglect cultural diversity risk undermining the learning experience for disadvantaged learners. When faced with content detached from their cultural contexts, disengagement and hindered comprehension become likely outcomes (Taylor & Francis, 2017b). In addition, cultural barriers assume another facet in the lack of culturally relevant examples, analogies, and case studies within course materials. Disadvantaged students often struggle to establish connections with material that does not align with their real-life experiences. As a result, this disconnect hampers their understanding of concepts (Hodgson & McConnell, 2019).

To address these challenges, the path to solutions leads to educational institutions and course designers that play a pivotal role in overcoming the obstacles posed by language and cultural barriers. This entails adapting content to local contexts, integrating diverse viewpoints, and cultivating an atmosphere of cultural awareness. These strategies have the potential to not only increase engagement but also improve comprehension for marginalized learners. (Levin & Waugh, 2013; Waters, 2011; Brown & Brown, 2009). This transformative endeavor empowers learners who have been marginalized to overcome obstacles and embrace the possibilities offered by distance education.

g. Limited Motivation and Engagement

Within the transformative context of distance education, there exists a twofold commitment to flexibility and accessibility. However, concealed within this commitment is the obstacle of constrained motivation and engagement, a difficulty that disproportionately affects disadvantaged populations. This obstacle appears as a hindered impetus for active involvement in digital learning settings, ultimately leading to diminished educational achievements (Rovai, 2003). To begin with, one pivotal dimension of this challenge is the isolation that often accompanies distance education for disadvantaged learners. The camaraderie and peer interactions inherent in traditional classrooms become elusive, leading to a sense of detachment. This detachment, in turn, threatens the sense of belonging and community, factors that are known to fuel engagement (Dennen, 2011; Vonderwell & Zachariah, 2005). Another dimension is the absence of face-to-face accountability, a phenomenon catalyzed by the virtual nature of online learning. For disadvantaged learners, who may grapple with self-regulation and discipline, the absence of external monitoring and immediate feedback can exhaust their commitment to the learning journey. The challenge posed by this absence is magnified for those who are already disadvantaged (Taylor & Francis, 2017; Harasim, 2012).

Additionally, another aspect of this challenge for disadvantaged learners is the lack of support systems. Unlike, in on-campus settings distance education often lacks accessible mentors, academic advisors, and comprehensive

learning materials. This can be particularly challenging for learners as they face difficulties in seeking assistance. As a result, the limited support available undermines their motivation and persistence creating a cycle that perpetuates these challenges (Mtebe & Raphael, 2018; Turner, González Canché, & Wenz-Gross, 2015). A significant contributor to the challenge of limited motivation and engagement is the lack of tangible rewards. Traditional classrooms often offer immediate reinforcements like grades, certificates, and in-person interactions that serve as motivational catalysts. The virtual realm of distance education, however, lacks these motivators, thereby diminishing the incentive for disadvantaged learners to fully engage (Murnane et al., 2020; Vonderwell & Zachariah, 2005).

To navigate these barriers, the path to fostering engagement and motivation requires strategic deliberation. The incorporation of interactive elements, such as group projects, peer assessments, and synchronous discussions, serves to cultivate a sense of community, thereby enhancing motivation. Moreover, the provision of regular communication, timely feedback, and well-articulated learning objectives become the key to sustaining learners' engagement (Mtebe & Raphael, 2018; Garrison & Vaughan, 2013). By understanding the paramount importance of cultivating a supportive learning community, interlacing interactive elements, and bestowing consistent feedback, educational stakeholders can contribute to inclusive access via online and distance learning.

h. Disconnection from Learning Communities
The issue of feeling disconnected from learning communities is an obstacle that is often felt strongly by disadvantaged groups. Although distance education provides flexibility and convenience, not being physically present on campus and having opportunities for interaction can lead to feelings of isolation. This ultimately undermines the sense of belonging and engagement that are crucial for learning (Shea &Bidjerano, 2010). At the heart of this challenge lies the absence of face-to-face interactions, which traditional classrooms offer in abundance. The interactions among peers and instructors not only enrich the learning process but also foster a sense of community (Shea et al., 2010; Garrison, Anderson, & Archer, 2000). Yet, disadvantaged learners, traversing the virtual corridors of distance education, often find themselves bereft of these vital interactions. The outcome is a palpable sense of isolation, detachment, and a yearning for the social support that conventional classrooms inherently provide (Vonderwell & Zachariah, 2005).

The web of detachment expands even more, entwining itself around the constraints of limited networking opportunities. Beyond knowledge acquisition, education is also a bridge to a network that can shape academic and professional trajectories (Turner, González Canché & Wenz-Gross; 2015). Disadvantaged learners, dealing with socioeconomic limitations, find these opportunities elusive, further widening the gap in networking events, mentorship connections, and collaborative endeavors that could potentially enhance their academic growth (Taylor & Francis, 2017a). Moreover, disadvantaged learners can distinctly feel the absence of informal mentorship and guidance often intrinsic to on-campus environments. The personal interactions that facilitate academic advice, career guidance, and emotional support are often distant dreams in the realm of virtual learning. This can deprive learners of a crucial support system that could aid them in navigating the complexities of education and life (Perna, 2020; Darling-Hammond & Post, 2019). Besides, in the collective environment of learning, shared experiences, and diverse viewpoints are interwoven to create a mosaic of deeper comprehension. However, disadvantaged learners, distant from the shared physical spaces, may miss out on these chances. The absence of collective learning experiences can hinder their ability to develop a holistic understanding of subjects and to appreciate the richness that differing perspectives bring (Levin & Waugh, 2013).

To bridge this detachment gap for disadvantaged individuals, virtual discussion forums and synchronous sessions can mimic the essence of classroom debates, fostering a sense of community even in the virtual world. Collaborative projects, driven by technology, can create bonds among learners that mirror the camaraderie of on-campus teamwork. Additionally, educational institutions can proactively establish online mentorship programs and networking platforms, deliberately fostering connections that otherwise might not evolve (Anderson, 2008; Shia, Li & Pickett, 2006; Vonderwell & Zachariah, 2005). By recognizing the pivotal role of social interactions, forging pathways to virtual networking, and nurturing mentorship opportunities, educational stakeholders can ensure that distance education transcends its physical limitations. It, thus, transforms online learning into a conduit for inclusive education, empowering marginalized learners through their learning journey.

ENHANCING ACCESS AND ENGAGEMENT IN OPEN AND DISTANCE LEARNING THROUGH UNIVERSAL DESIGN FOR LEARNING
Open and distance learning has gained prominence in contemporary education, offering flexibility and accessibility to diverse learners (Peters, 2009). However, in an era characterized by varied learner profiles, including differences in abilities, backgrounds, and preferences, the need for inclusive educational design is paramount. Universal Design for Learning (UDL), initially rooted in the field of special education but with broader applications, presents

a compelling framework to address these challenges (CAST, 2018). It is an educational framework that is instrumental in creating inclusive learning environments and catering to the diverse needs of all learners, including disadvantaged groups (Rose & Meyer, 2002). UDL principles serve to support these disadvantaged groups by dismantling barriers to education, enhancing engagement, and fostering equitable learning experiences (CAST, 2018). Universal Design for Learning is highly compatible with open and distance learning, as it promotes the creation of accessible, engaging, and flexible online educational experiences.

A core principle of UDL is the provision of multiple means of representing content (Rose & Meyer, 2002). Within the context of open and distance learning, this translates into the utilization of diverse formats for course materials, including text, audio, video, and interactive simulations. This approach accommodates the varying learning preferences of online learners (CAST, 2018). For instance, a student with a visual impairment might rely on audio content, while another student who prefers visual learning can benefit from video presentations. This adaptable approach ensures that learners can access course materials in ways that align with their individual needs and learning styles, thereby promoting a sense of inclusivity and engagement.

UDL also emphasizes affording learners' multiple avenues for expressing their understanding and knowledge (Meyer & Rose, 2005). In the online learning environment, this implies allowing students to choose from a range of options for demonstrating their mastery of the subject matter. This inclusivity extends to students with diverse communication abilities or preferences. For example, a student may excel in conveying their understanding through written assignments, while another may prefer to articulate their insights in a video presentation or through interactive multimedia. By providing these alternative means of expression, open and distance learning becomes more accessible and equitable, as students can select the mode that best suits their abilities and strengths.

Another core UDL principle is the provision of varied means for engaging with learning materials and activities (CAST, 2018). In the realm of open and distance learning, this necessitates offering a spectrum of options, including asynchronous discussion forums, collaborative projects, self-paced modules, and synchronous webinars. Such diversification of engagement opportunities aligns with the recognition that learners have distinct preferences and learning styles, thus making the learning experience more accessible and engaging for a broader array of learners. Students can choose the mode of engagement that resonates with their preferences and circumstances, enhancing their motivation and commitment to learning.

UDL's commitment to personalized learning experiences is of particular relevance in open and distance education settings (Rose & Meyer, 2002). Personalization can be achieved by enabling learners to select their unique pathways through course content, perhaps facilitated through adaptive learning platforms or the availability of a variety of resources and assessment options. This approach acknowledges that open and distance learning often caters to a diverse audience with varying backgrounds, prior knowledge levels, and learning objectives. Through customizable learning pathways, educators can ensure that each learner receives an education tailored to their individual needs, promoting success and inclusivity.

A fundamental aspect of UDL is accessible design, which entails the creation of educational materials and online platforms that are usable by individuals with disabilities (Burgstahler, 2015). In the context of open and distance learning, this involves careful consideration of accessibility features such as screen reader compatibility, captioning, keyboard navigation, and other elements that ensure learners with disabilities can participate fully in the online educational experience. This commitment to accessible design not only aligns with principles of equity but also contributes to creating a more inclusive learning environment for all students.

CONCLUSION
In the pursuit of fostering equitable educational access and promoting inclusivity, the challenges of distance education for disadvantaged groups have emerged as focal points of concern. This paper has extensively explored the multifaceted barriers faced by marginalized populations in the realm of online learning, drawing insights from a range of academic literature. As evidenced by the research, challenges such as limited digital literacy, socioeconomic constraints, language, and cultural barriers, lack of learning support and resources, limited motivation and engagement, and disconnection from learning communities collectively hinder the realization of equitable educational opportunities for these groups.

The disadvantaged group is a broad term encompassing various categories such as socioeconomic status, disabilities, linguistic background, etc. This paper, thus, might not adequately capture the nuances of each group's experiences. Besides, although highlighting drawbacks is valuable, a paper should ideally also propose potential solutions or strategies for mitigating these drawbacks. So, focusing solely on the problems of ODL for disadvantaged groups without offering guidance on improvement might limit the paper's practical applicability.

Addressing these challenges emphasized in this paper demands a holistic approach that transcends technological solutions. It necessitates the collaboration of educational institutions, policymakers, instructors, and stakeholders to develop multifaceted strategies that consider the interplay of socioeconomic, cultural, and pedagogical factors. By enhancing digital literacy training, expanding financial aid options, localizing content, fostering cultural sensitivity, and creating supportive virtual communities, educational stakeholders can mitigate these challenges and pave the way for disadvantaged learners to engage fully and effectively in distance education.

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Examination of Graders' Satisfaction with the Implementation of Open-Ended Questions in Open and Distance Learning

Assoc.Prof.Dr. Murat Akyıldız
Anadolu University, Open Education Faculty
muratakyildiz@anadolu.edu.tr
ORCID: 0000-0001-5069-0132

Assist.Prof.Dr. Nejdet Karadağ
Anadolu University, Open Education Faculty
nkaradag@anadolu.edu.tr
ORCID: 0000-0002-9826-1297

Assist.Prof.Dr. Belgin Boz Yüksekdağ
Anadolu University, Open Education Faculty
bboz@anadolu.edu.tr
ORCID: 0000-0003-2862-3544

Lecturer Ali İhsan İbileme
Eskisehir Technical University
aliihsan@anadolu.edu.tr
ORCID: 0000-0002-4705-3973

ABSTRACT

This study aims to examine graders' satisfaction with the open-ended question implementation in one of the open education systems in Türkiye. The quantitative research method was adopted in this study in which the data were collected through a questionnaire developed by the researchers. The graders' satisfaction regarding open-ended question implementation was discussed in three dimensions. These are "the functioning of the open-ended question grading system", "the need for communication/help while using the system" and "the importance of open-ended questions in open and distance learning". Whether the sub-dimension scores of the measurement tool were different from the expected values was examined with the Wilcoxon test. The graders' satisfaction regarding open-ended question implementation was analysed according to gender, title, and course variables. It was observed that the graders' satisfaction levels regarding the "Satisfaction with the grading system " and the "importance of open-ended questions in open and distance learning" were high. It was observed that the satisfaction levels of the graders regarding the " Satisfaction with the grading system", "the need for communication/help arising during using the system" and "the importance of open-ended questions in open and distance learning" did not change according to gender, academic title and the type of course they scored.

INTRODUCTION

Assessment is an important process in terms of providing an opportunity to evaluate education in terms of time, effort, and cost by determining whether learners have achieved their learning goals, and deciding whether to continue after the process, whether it is successful, whether or not to proceed to the next stage, depending on the characteristics of the learner (Nitko, 2004). In open and distance education, the process of specifying the observed qualities and observation results with numbers or symbols and making a value judgment about the measured quality by comparing the measurement results with a criterion is particularly important as it can be used to motivate distance learners who take responsibility for their learning (Harlen & Deakin-Crick, 2003). In the open and distance learning system; the process of evaluating students includes limitations compared to the traditional education environment because the instructor and learners are physically in different environments (Puspitasari, 2010). The reasons such as the fact that learners are of different ages and occupations, enrol in programs for different purposes, have various learning materials, and have different criteria for success make assessment a problematic process in open and distance education (Thorpe, 1988). In this context, instructors do not have many options to measure the performance of learners in open and distance education (McIsaac & Gunawardena, 1996). In distance education, some of the measurement and assessment activities are organized based on study materials prepared according to self-learning principles; in determining the success level of students, mostly time-limited, supervised exams are used. Today, although technological developments offer new opportunities to instructors in this sense, it is not entirely possible to ensure identity control and reliability in new learning environments. However, Tomas et al. (2015) state that distance education in higher education is increasing rapidly, and technology-based assessment is progressing more slowly than expected.

In mega universities providing open and distance education services around the world, multiple-choice tests called objective tests are used as a basic measurement tool, as well as homework and portfolio, in determining the success levels of learners. Research conducted on these institutions has revealed that learners prefer different measurement tools such as true-false tests, matching tests, homework/projects, and graduation thesis in measuring their knowledge (Karadağ, 2014). In the study of Cabı (2016), it was seen that distance learners wanted to be evaluated with exams. Because each question type has superior and non-superior aspects, it is also very important to increase the reliability of using different question types in measurement tools to turn the superiority of different question types over each other into an advantage (In'nami & Koizumi, 2009). In this context, it is not possible to determine whether high-level thinking skills are acquired or not with tests in which only multiple-choice questions are used (Husain et al., 2012).

Open-ended questions are the most appropriate question types used to measure high-level skills such as problem-solving, organizing problems, generating new and original ideas, evaluating ideas, applying the information in different situations, establishing cause-effect relationships, making generalizations, generating hypotheses, making comparisons between alternatives (Kwon et al., 2006; Foong, 2002). Long mixed tests are moderately difficult and more distinctive than tests consisting of only multiple choice and only open-ended items (Kurniawan et al., 2018). The tests, which include open-ended questions, focus on perception, justification, and the ability to use information, and that such questions allow learners to reflect on their differences (Melovitz Vasan et al., 2017; Wooten et al., 2014). On the other hand, the answers given by the learners to the open-ended questions can also be used to obtain information about the quality of the learning process (Lee, Liu, & Linn, 2011). It is stated that open-ended questions expressing classical, written questions that cannot be answered simply as yes or no and that do not offer options are the most appropriate question type to measure high-level skills. At the same time, other superior aspects of open-ended questions are that they reduce the measurement error by eliminating chance success, are suitable for partial scoring, and can be prepared more easily than multiple-choice items (Allan, & Driscoll 2014; Ventouras et al., 2011). However, in the use of open-ended questions; There may be situations such as taking a long time to implement and scoring, difficulty in providing content validity, fewer questions due to time constraints, and most importantly, inability to score objectively (Palmer, & Devitt, 2007; Reiner et al., 2003).

When the studies on evaluation with open-ended questions in universities that implement open and distance education in the world are examined, it is seen that the evaluation made with open-ended questions from both learners and instructors is subjective (Aisha, 2007). For example, in AIOU, the success of students is determined by homework and exams with three hours of open-ended questions. Scoring is done by the teaching staff working at universities throughout the country, and when these are not sufficient, with the contribution of teachers affiliated to the Ministry of National Education. An automation system is not used and the announcement of the exams takes a long time like one month. In this situation, when learners are informed about the process and how the scoring will be, students' anxiety about grader reliability can be reduced.

The difficulty of distinguishing between true and false in open-ended questions would make it difficult to read and score the paper. On the other hand, the majority of the educators scored the questions according to the degree of difficulty, that they gave high points to difficult questions and lower points to easy questions, and that they did not prefer to give equal points to each question. At the same time, the student's inability to remember information during the exam, insufficient writing skills, or prejudices about the difficulty of open-ended questions are also conditions that affect student performance and the use of open-ended questions (Reiner et al., 2003).

An under-graduate level open education system in Türkiye has also started to determine student success with tests that include open-ended questions in the 2017-2018 academic year fall semester exams. During this period, two short-answer questions worth 5 points, one long-answer question worth 10 points, and 16 multiple-choice questions worth 5 points were included in the tests consisting of 19 questions in certain courses. With the long answer question, learners are expected to express their views and thoughts on the given topic by writing a paragraph. Open-ended questions are evaluated with the Open-Ended Question Grading (OEQG) System designed online. Until the open-ended question implementation, which is the subject of this study, it is the first example in the context of open and distance learning throughout the country. The details of the installed system are given below.

Open-Ended Question Grading (OEQG) System
Within the scope of Open Education System (OES), open-ended questions are asked to students in midterm exams in six different departments at the undergraduate level. In this context, an infrastructure has been prepared by the Computer Research and Implementation Centre (CRIC) Web Group for the grading of open-ended questions. The open-ended question system consists of two different stages. The first stage is the implementation of the open-ended exam, and the second stage is the grading of the open-ended exam. During the implementation phase of the

open-ended exam, the long and short-answer questions that are planned to be asked in the exam are taken from the course editor by the Test Research Unit. The determined questions are presented to the students after the multiple-choice questions in the question booklet containing the related courses. In an exam, a total of three open-ended questions are asked, two with short answers and one with long answers, for a course. In addition to the optical form prepared for multiple choice questions, a separate answer sheet is prepared for the students who take the course in the program where open-ended questions will be asked by the Computer Research and Implementation Centre Exam Software team. An area is left on this answer sheet where students can enter long answer questions along with fill-in-the-blank or short answer questions. While students enter the answers to the multiple-choice questions in the optical form, they enter their answers to the open-ended questions on the answer sheet. After the exam implementation phase, the answer sheets that come to CRIC are scanned by scanner devices and converted into digital form. After this stage, the scanned papers are sent to the OEQG system and the grading process begins. There are four different user roles in OEQG: Observer, Section Coordinator, Referee, and Grader. The duties of these users in the OEQG system are described below.

Grader Role: They are the users who evaluate the papers automatically assigned by the system according to certain criteria.

Figure 1. Grader Page View
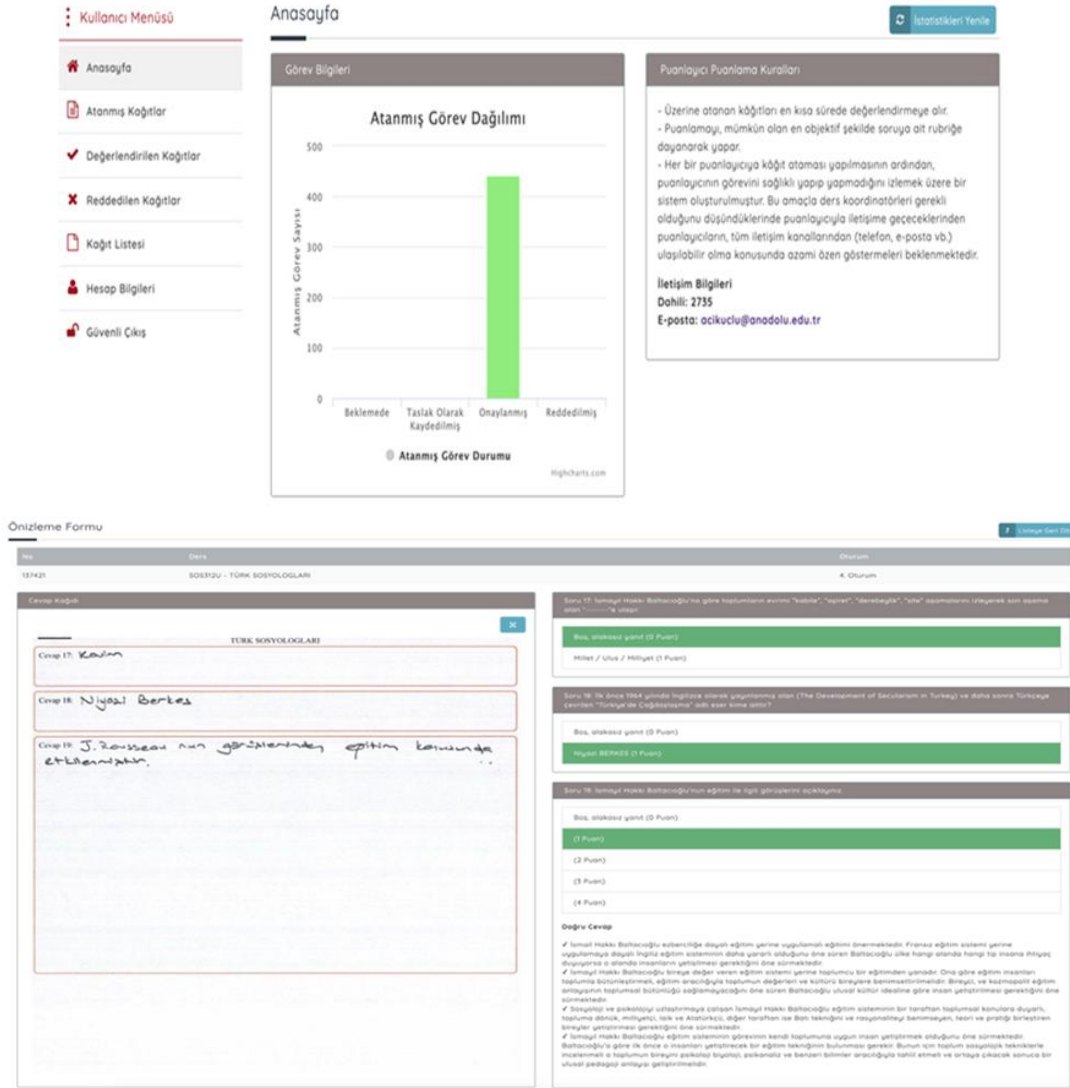
Referee Role: In case of conflict in the papers evaluated by the graders, they are the reviewers.

Figure 2. Referee Page View
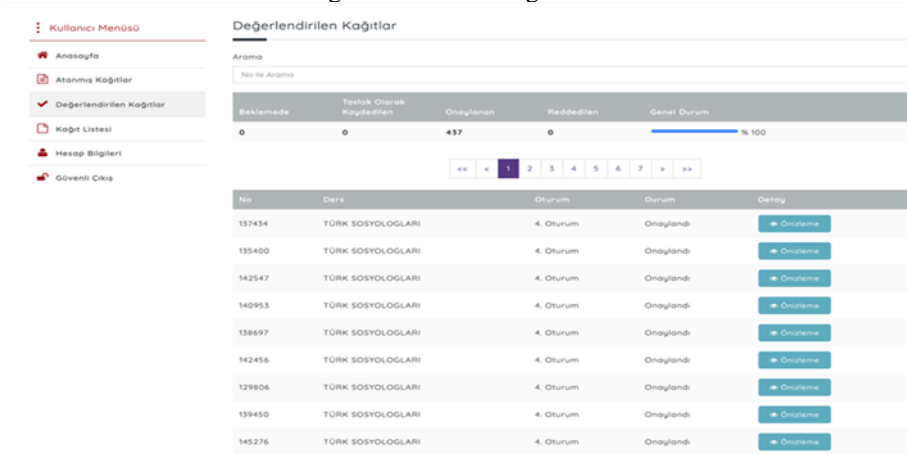
Program Coordinator Role: Each program has a coordinator. The user follows the referees and scorers in the program. Monitoring of scorers, change of scorers, tracking of rejected papers and assignment to referees, etc. performing transactions.

Figure 3. Program Coordinator Page View

Observer Role: Users who monitor the entire system over the OEQG system.

Figure 4. Observer Page View
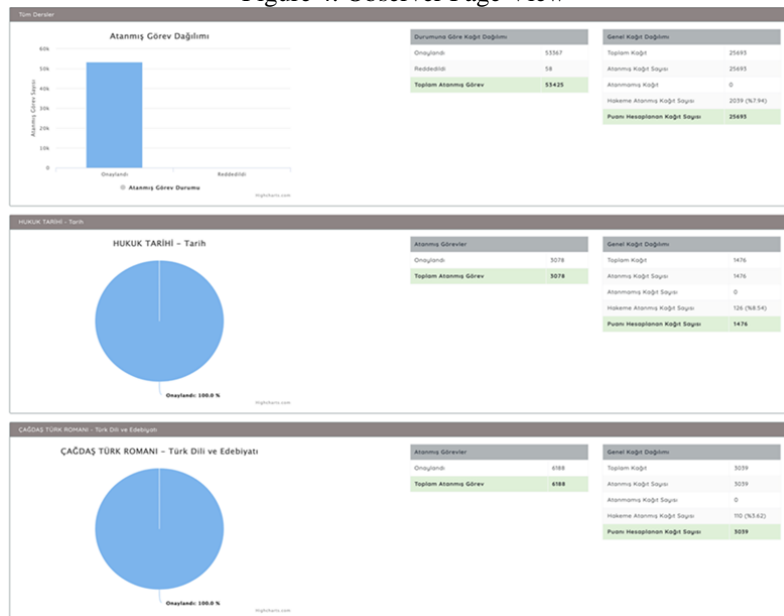
OEQG Workflow Process
Papers scanned over the OEQG system are uploaded to the system at regular intervals. After this loading process, each paper is automatically assigned to two different graders responsible for the course. After each assignment, the graders are informed via SMS and e-mail. At the same time, within the period determined during the grading phase, task reminders are made to the graders at regular intervals every day. Until all the papers belonging to the students are scanned, paper assignments continue to be made to the graders at regular intervals. The path followed during the grading of a paper is explained below. Papers assigned by each grader are evaluated based on the rubric. For long answer questions, a rubric with a minimum of three or more options is presented. In short answer questions, a rubric consisting of true/false options is presented. All papers are shown to the scorers before the assignment. In this way, the rubrics are organized by examining the answers given by the students by the graders. In this direction, it has been tried to reduce the risk of error in the grading by considering all possibilities. Different graders evaluate each paper to make a fair grading. If there is a conflict between the points given by the scorers, the paper is sent to the referee.

The referee can only take action on the disputed question. For example, if the first grader gives two points and the second grader gives four points in a long answer question on a paper, a conflict arises. In this case, the referee only sees the long-answer question and can act on it. After the referee evaluates the disputed question, the average score of the paper is calculated by the system according to the weight of the questions in the rubric. If there is no disagreement, the average score of the paper is calculated according to the weight of the questions by taking the average of the scores given by the graders.

Determining the satisfaction levels regarding open-ended questions, which have an important place in the grading activities of learners in increasing the quality in open and distance learning environments, is very important in terms of improving the practice. In this study, although it changes in each period, how the answers of 181,162 learners to open-ended questions in their own handwriting are perceived by 1411 raters, 58 referees, 4 coordinators and 4 observers, who evaluated their answers in 72 hours, were examined from various perspectives. In this context, the purpose of this research is to examine the satisfaction of graders with open-ended questions in the Open Education System. The graders' satisfaction with open-ended questions was discussed in three dimensions. These are "Satisfaction with the grading system", "The need for communication/assistance during using the system" and "The importance of open-ended questions in open and distance learning".

THE STUDY
This study uses quantitative research method. Design of the study is survey. Data were gathered by a scale developed by researchers. In this study, answers to the following questions were sought:

RQ1: Do graders' scores on subtests differ from the midpoint subtest score level?
RQ2: Do graders' sub-dimension scores differ according to gender?
RQ3: Do graders' sub-dimension scores differ according to the courses they grade?
RQ4: Do graders' sub-dimension scores differ according to their academic titles?

Participants
The participants of the research are 169 instructors who work as graders in the open-ended question implementation in OES in the 2018-2019 academic year. The distribution of the graders participating in the study regarding their gender and academic titles is given in Table 1.

Table 1. Distribution of Graders By Gender And Academic Titles

Gender	N	%
Female	98	58
Male	71	42
Academic Title		
Professor doctor	13	7.7
Associate professor	29	17.2
Assistant professor	28	16.6

Lecturer doctor	8	4.7
Lecturer	26	15.4
Research assistant doctor	9	5.3
Research assistant	56	33.1
Total	169	100

Table 1 shows that while women constitute 58% of the graders participating in the research, the rate of men is 42%. Looking at the distribution of graders by academic titles, the title with the highest percentage is Research Assistant (33.1%).

The distribution of the courses that the participants worked on is given in the chart below.

Chart 1. The courses with open-ended question practice
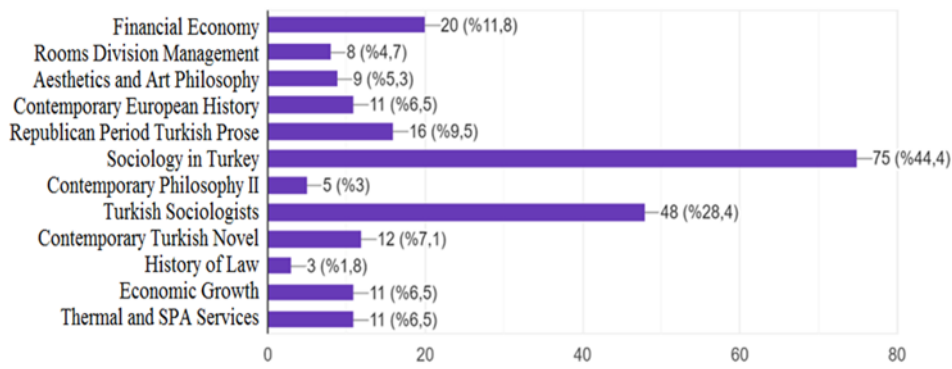
As seen in Chart 1, the course with the highest number of graders was "Sociology in Türkiye" (44.4%). This is followed by the Turkish Sociologists (28.4%) course. These two courses are taught in the Sociology Undergraduate Program, where the number of students in the Open Education System is high. The courses with the lowest number of graders are History of Law (1.8%) and Contemporary Philosophy-II (3%). This shows that the number of graders is determined in direct proportion to the number of students taking the course.

Data Collection
In the research, the data were collected with the help of a measurement tool prepared via Google Forms. In the measurement tool, there are 16 closed-ended and 1 open-ended questions, 11 of which are Likert type and 5 of which are answered as yes-no. In the open-ended question, graders were asked to state their opinions on other issues that were not included in the questionnaire regarding the implementation.

Since the items of the measurement tool used in the study were developed in line with 3 purposes, confirmatory factor analysis was applied to determine the extent to which the items measure these 3 objectives. The first factor, in which the items are grouped, is the satisfaction with the grading system, the second factor is the need for communication/help while using the system, and the third factor is the perceived importance of open-ended questions in open and distance learning. Since factor scores were thought to be correlated with each other, analyses were performed by allowing correlations between factors. Since the items were ordinally ranked, confirmatory factor analysis was applied using the diagonally-weighted least squares method (DWLS) and oblimin rotation.

As a result of the confirmatory factor analysis, Chi-Square value was 153.796, degrees of freedom 101, RMSEA value was 0.056, SRMR value was 0.110, CFI value was 0.95, NFI value was 0.87, TLI value was 0.94. When these fit indices were examined, it was seen that the 3-factor model has a good fit with the data (Kenny, 2020; Shi et al., 2019, Kline, 2016). The single-factor construction of the data was considered as an alternative model and tested against the 3-factor model. The RMSE value of this model was 0.081, the CFI value was 0.89, and the TLI value was 0.873. The difference between the chi-square values of the 3-factor model and the single-factor model (41.276, sd difference= 3) was significant in favor of the 3-factor model. The difference between the CFI values of the two models is larger than the 0.01 as suggested by Cheung and Rensvold (2002), in favor of the three-factor model. In line with these findings, it was decided that the scale measures three correlated dimensions: satisfaction

with the open-ended question system, the need for communication/help while using the system, and opinions on asking open-ended questions. Correlations between subscales were -0.326 between the first and second factors; 0.597 between the first factor and the third factor; It was observed as -0.140 between the second factor and the third factor. All correlations are statistically significant at the 0.05 level. The omega reliability coefficients of factors were respectively 0.74, 0.58 and 0.52.

All 169 instructors who participated in the open-ended question scoring process were contacted via e-mail and SMS, and the survey link and information letter were sent. The contribution of the study to the improvement of the system was mentioned in the information letter and it was stated that the participation was on a voluntary basis. The answers given to the measurement tool were collected between 14-20 February 2020.

Analysis of Data
Before the analyses data were checked in terms of normality and outliers. 14 outliers in the 2nd factor and 6 outliers were detected in the 3rd factor scores. All analyses were repeated by removing these extreme values from the analyses and by not removing them, and it was decided to use complete data as it was seen that extreme values did not change the results. Data were not normally distributed in most of the subgroups before and after removal of outliers. Normality tests were given before the corresponding analysis below.

Since the subscale scores were not normally distributed, Wilcoxon signed test was used to find an answer to the 1st question. Mann-Whitney test was used to find an answer to the 2nd and 3rd questions. Kruskal-Wallis test was used to find an answer to the 4th questions of the study.

In general, item level analysis results are not necessary but in order to inform readers about items, chi-square independence test was applied to each item to determine whether there is a significant independence between the agreeing/disagreeing level and gender, course type and academic title.

FINDINGS
In order to answer the first question, the midpoint scores (midpoint of possible min and max scores of subscales) of subscales were used as average satisfaction, need and perceived importance levels. Midpoints as average values frequently used as a cut-off point (Zheng et al., 2011; McDonald et al., 2014). Each subscale has its own score range and midpoint. Since subscale scores were not normally distributed (Shapiro-Wilk$_{factor1}$=0.937, n=169; p<0.05; Shapiro-Wilk$_{factor2}$=0.757, n=169, p<0.05, Shapiro-Wilk$_{factor3}$=0.968, n=169; p<0.05), one sample Wilcoxon signed test was used to test whether median subscale levels differs than average subscale value (Table 2).

Table 2. Wilcoxon Test Results

	Value	Sig.	Rank-biserial r
Satisfaction with the grading system **Average satisfaction level =15, $\overline{X}$=33.207, median=33 (min=24, max=37)**	14365.000	< .001 *	1.00
Need for communication/assistance while using the system **Average need level =1.5, $\overline{X}$=0.757, median=0 (min=0, max=3)**	2268.000	< .001 *	- 0.684
The importance of open-ended questions **Average importance level =12, $\overline{X}$=14.053, median=14 (min=7, max=20)**	10314.500	< .001 *	0.822

*p<0,01

When Table 2 is examined, it is seen that the participant's satisfaction with the "grading system" (median=33) is significantly higher than the average satisfaction level (midpoint = 15; W=14365, p<0,05). The communication/help needs of the participants (median = 0) while using the system were significantly lower than the median need level of 1.5 (midpoint = 1.5; W=2268). The participants' median scores (12) on the perceived importance of open-ended questions in open and distance learning were significantly higher than the average perceived importance level (midpoint = 12; W=10314.5). All comparisons have significantly high rank biserial correlation-based effect sizes.

In order to answer the second question, score distributions of gender groups were examined and not found normal. Normality test results and descriptive statistics given below in Table 3.

Table 3. Normality Tests and Descriptive Statistics Table For Gender

	Group	N	Median	Shapiro-Wilk	p	Min	Max
Satisfaction with the grading system	Women	98	34	0.927	< .001	24	37
	Men	71	33	0.94	0.002	25	37
Need for communication/assistance while using the system	Women	98	1	0.774	< .001	0	3
	Men	71	0	0.725	< .001	0	3
Importance of open-ended questions	Women	98	14	0.964	0.009	8	18
	Men	71	14	0.95	0.006	7	20

As can be seen in Table 3 none of the distributions were normal. In order to test whether the mean rank values of subscale scores differ significantly across gender groups, Mann-Whitney test was applied. The results are given in Table 4.

Table 4. Mann-Whitney Test Results for Gender

Subscale	Group	Mean rank	W	P
Satisfaction with the grading system	Women	87.13	3270	0.504
	Men	82.06		
Need for communication/assistance while using the system	Women	89.09	3078.5	0.164
	Men	79.36		
Importance of open-ended questions	Women	89.23	3779.5	0.335
	Men	81.94		

Mann-Whitney test indicated that satisfaction with the grading system, need for communication while using the system and perceived importance of open-ended questions was not significantly higher in any gender. The results indicated that graders from each gender have the same satisfaction with the grading system, require the same need for communication while grading and give the same importance to the open-ended questions. As previously shown, graders' median scores were higher than the average score in each sub dimension. Therefore, it can be concluded that graders of both genders have high scores in each sub dimension.

In order to answer the third question, score distributions of course groups were examined and not found normal. Normality test results and descriptive statistics given below in Table 5.

Table 5. Normality Tests and Descriptive Statistics Table For Courses

Subscale	Group	N	Median	Shapiro-Wilk	p	Min	Max
Satisfaction with the grading system	Numeric	20	33	0.910	0.065	25	37
	Verbal	149	34	0.939	< .001	24	37
Need for communication / assistance while using the system	Numeric	20	0	0.626	< .001	0	1
	Verbal	149	1	0.767	< .001	0	3
Importance of open-ended questions	Numeric	20	13	0.930	0.152	8	20
	Verbal	149	14	0.966	0.006	7	20

Normality tests showed that only numeric class graders' scores are normal in the first and the last dimension. All other groups' score distributions are not normal. In order to test whether the mean rank values of graders' subscale scores differ significantly across verbal and numeric course type Mann-Whitney test was applied. The results are given in Table 6.

Table 6. Mann-Whitney Test Results for Course Type

Subscale	Group	Mean rank	W	p
Satisfaction with the grading system	Numeric	80.73	1404.5	0.677
	Verbal	85.57		
Need for communication/assistance while using the system	Numeric	71.10	1212	0.140
	Verbal	86.87		
Importance of open-ended questions	Numeric	54.10	872	0.002
	Verbal	89.15		

Mann-Whitney test indicated that mean rank values of satisfaction with the grading system and need for communication while using the system was not significantly higher in any course type. On the contrary there is a significant difference between mean rank values of grading course type (W=872, p<0.05). Graders' who were grading numeric courses have higher mean rank values than those grading verbal courses which means verbal course graders give more importance to open ended questions than numeric course graders.

In order to answer the fourth question, score distributions of groups based on academic title were examined and not found normal. Normality test results and descriptive statistics given below in Table 7.

Table 7. Normality Tests and Descriptive Statistics Table For Courses

Subscale	Group	N	Median	Shapiro-Wilk	p	Min	Max
Satisfaction with the grading system	Lecturer	26	34	0.915	0.035	28	37
	Res. Asst.	56	33	0.935	0.003	26	37
	Asst. Prof	45	34	0.944	0.029	27	37
	Assoc. Prof	29	33	0.925	0.041	25	37
	Prof	13	30	0.911	0.188	24	37
Need for communication / assistance while using the system	Lecturer	26	0	0.807	< .001	0	3
	Res. Asst.	56	0	0.785	< .001	0	3
	Asst. Prof	45	0	0.751	< .001	0	3
	Assoc. Prof	29	0	0.632	< .001	0	2
	Prof	13	0	0.662	< .001	0	3
Importance of open-ended questions	Lecturer	26	8	0.883	0.007	8	17
	Res. Asst.	56	9	0.920	0.001	9	20
	Asst. Prof	45	8	0.958	0.104	8	20
	Assoc. Prof	29	7	0.955	0.242	7	18
	Prof	13	11	0.946	0.536	11	18

Normality tests showed that Prof's scores are normally distributed in the first and the last dimension. In the last dimension Asst. Prof, Assoc. Prof and Prof groups have normal distributions. All other conditions have non-normal distribution. Therefore, Kruskal-Wallis test was used to compare mean ranks of subgroups in each dimension. The results are given in Table 8.

Table 8. Kruskal-Wallis Test Results for Graders' Title

Subscale	Group	Mean rank	H	Df	p
Satisfaction with the grading system	Lecturer	92.79	2.528	4	0.640
	Res. Asst.	87.62			
	Asst. Prof	81.43			
	Assoc. Prof	85.78			
	Prof	68.77			
Need for communication/assistance while using the system	Lecturer	91.13	5.708	4	0.222
	Res. Asst.	92.26			
	Asst. Prof	84.40			
	Assoc. Prof	69.67			
	Prof	77.73			
Importance of open-ended questions	Lecturer	77.94	3.455	4	0.485
	Res. Asst.	90.63			
	Asst. Prof	90.68			
	Assoc. Prof	75.48			
	Prof	76.46			

Kruskal-Wallis test indicated that mean rank values of graders who had different academic titles had no significant difference for all of the subscales. In other words, each group which has a different academic title has the same mean rank score in each subscale. Therefore, it seems that the academic title of graders doesn't change the mean rank values of the scores. Based on these results all graders from different academic levels have the same level of acceptance for open-ended questions and satisfaction with the grading system.

As mentioned before item level analysis results are not necessary but in order to inform readers about items, chi-square independence test was applied to all items using gender, course type and academic title. Likert type item structure recoded as agree and not agree. For this purpose, item scores including 1, 2 and 3 were coded as disagree, 4 and 5 were recoded as agree. Gender, course type and academic title were used as is. Results are given below in Table 9.

Table 9. Item Level Chi-Square Independence Test

Statements	Gender	Academic Title	Type of Class
	X2 (df-p)	X2 (df-p)	X2 (df-p)
Before I started scoring open-ended questions, I had enough information about the scoring process.	1.02 (4-0.600)	6.55 (36-0.886)	1.26 (4-0.533)
I find it necessary to implement open-	0.287 (4-0.991)	36.6 (36-0.048)*	8.81 (4-0.066)

ended questions.

I think that students get more points from open-ended questions than they deserve.	6.31 (4-0.177)	23.8 (36-0.476)	6.54 (4-0.162)
I think that open-ended questions measure students' knowledge better than multiple-choice questions.	6.05 (4-0.196)	22.6 (36-0.544)	6.48 (4-0.166)
In the answers of the students, I encountered original/different answers that could be added to the answer key.	1.15 (4-0.885)	16.1 (36-0.883)	10.6 (4-0.03)*
I think that saving as a draft in scoring contributes positively to the scoring process.	5.27 (4-0.261)	26.0 (36-0.355)	5.60 (4-0.231)
I could easily access the papers assigned in the open-ended question scoring software.	5.14 (4-0.162)	28.0 (36-0.063)	5.25 (4-0.154)
I was able to evaluate the questions easily in the open-ended question scoring software.	3.53 (4-0.316)	10.4 (36-0.918)	0.889 (4-0.828)
I think the paper assignment process is done in appropriate periods.	2.93 (4-0.570)	17.5 (36-0.827)	2.71 (4-0.607)
I found the open-ended question scoring software useful.	4.47 (4-0.346)	24.9 (36-0.411)	0.742 (4-0.946)
With the open-ended question scoring software, I was able to follow the system instantly through informative SMS/e-mail throughout the process.	0.824 (4-0.672)	15.9 (36-0.198)	0.512 (4-0.774)
The time given for scoring the open-ended questions was sufficient.	0.01 (1-0.993)	16.9 (6-0.010) *	0.071 (1-0.790)
Did you feel the need to communicate with other graders while scoring open-ended questions?	1.20 (1-0.273)	12.0 (6-0.061)	3.25 (1-0.07)
Did you feel the need to communicate with the referee while scoring open-ended questions?	0.352 (1-0.553)	4.13 (6-0.659)	0.014 (1-0.906)
Did you feel the need to communicate with the coordinator while scoring open-ended questions?	1.27 (1-0.260)	3.13 (6-0.793)	3.33 (1-0.068)
Did you find the open-ended question grading guide video helpful?	0.087 (1-0.768)	10.10 (6-0.12)	2.76 (1-0.096)

*$p < 0.05$

As can be seen in Table 9, three of the items have significant dependence. Most of the items has no significant dependency with gender, course type or academic title.

CONCLUSIONS
When the findings were evaluated, it was seen that the need for communication/help while using the system were

lower than the average need. This result can be attributed to graders not needing help before, during, and after the scoring process. In this context, it can be said that the OEQG system responds to the needs of the graders. On the other hand, it was observed that the graders' satisfaction levels were high regarding the satisfaction with the grading system and the importance of open-ended questions in open and distance learning. Alkan (2013) stated that intelligibility is provided more easily with open-ended questions, they focus on their ability to use logic and knowledge, and their success levels are revealed better than multiple-choice questions. On the other hand, since the answers to open-ended questions will show individual differences due to their perspectives, scoring methods and reliability of scoring are very important. In the related literature, the most important problem in the use of open-ended items is the inability to score objectively (Romagnano, 2001).

Each learner's answer sheet was evaluated by at least two graders to provide objective scoring in the OEQG system, which is the subject of this study. If the difference between the two scores is large, the answer sheet was sent to a referee for further evaluation. Ebel (1951) stated that the use of more than one grader in the grading process of tests consisting of open-ended questions and the means of the scores given by different graders are necessary to obtain reliable results regarding the success levels of learners. Güler et al. (2015) stated that correlations between graders greater than 0.70 reflect a high level and positive relationship. Turgut & Baykul (2012) stated that at least two and at most five people should be assigned as graders in open-ended questions, and increasing the number of graders would not provide a significant increase in the reliability of the scoring.

Dubrovich (2002) stated that there should be consistency among the graders and that the graders should be trained in scoring beforehand to ensure reliability. He emphasized that the preparation of scoring instructions (rubrics, checklists, etc.) for the feature to be measured to increase reliability would increase the consistency among the graders. In this study, rubrics for each lesson were prepared and a reliable scoring was ensured. All papers are shown to the scorers before the assignment. In this way, the rubrics are organized by examining the answers given by the students by the graders. On the other hand, studies are showing that rubrics are insufficient to eliminate grader effects such as grader strictness/generosity (Alharby, 2006). In addition to the scorer effect, the differences in course types may also be an important factor in the emergence of this situation. Interaction between grader and criterion may cause inconsistency between graders (Bıkmaz Bilgen & Doğan, 2017).

It has been emphasized in some studies that graders can be objective or biased (Köse et al., 2016; Yüzak et al., 2015). Çetin (2019) stated that although the scoring criteria were determined before the scoring process, there were differences in the scoring process among the graders, and suggested that the Multi-Faceted Rasch measurement model be used effectively in the exam gradings in higher education to solve this problem. The graders' satisfaction with each sub-dimension does not differ according to gender, academic titles, and the type of course they grade. In other words, the satisfaction levels of the graders are similar in terms of gender, course type, and titles. The participants of the study suggest that open-ended questions are important in distance education and that the implementation should be expanded with more courses. Providing the necessary training to the coordinators, graders, referees, and observers who will take part in the dissemination process is seen as one of the important activities in increasing the efficiency of the implementation.

On the other hand, it is thought that it is useful to employ different measurement tools such as open-ended questions, homework / projects, portfolios in order to measure the achievements of open and distance learners at the upper cognitive level included in the Bloom's Taxonomy. The fact that decision makers in open and distance learning focus on this issue will increase the quality of assessment practices.

It is considered that it would be beneficial to design and implement similar systems, which are the subject of this study, so that education is not interrupted by measuring high-level achievements in extraordinary situations such as COVID-19 pandemic, energy crisis, natural disasters.

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Examining Openness in Mega Open Universities in the Context of Institutional Communication Management

Gülfem GÜRSES
Anadolu University-Open Education Faculty, TURKIYE-ESKISEHIR
gulfemg@anadolu.edu.tr
ORCID: 0000-0002-2365-6411

Berrin ÖZKANAL
Anadolu University-Open Education Faculty, TURKIYE-ESKISEHIR
bozkanal@anadolu.edu.tr
ORCID: 0000-0002-9506-6082

Müjgan YAZICI
Anadolu University-Open Education Faculty, TURKIYE-ESKISEHIR
mbozkaya@anadolu.edu.tr
ORCID: 0000-0002-5575-8877

ABSTRACT

The primary objective of this research is to ascertain the manner in which higher education institutions offering open and distance education incorporate the concept of openness into their vision, mission, core values, and tactics. This study employs a descriptive research design to ascertain the current state of affairs. The research methodology employed in this study involves document analysis. The study used a purposive sampling technique for the selection of participants. The key factors for purposive sampling are the existence of purpose, vision, core values, and strategic plans for the year 2018 and beyond, as well as the geographical diversity of the universities, as shown on their respective websites. In this study, we conducted an examination of the vision, mission, core values, and strategic plans presented on the websites of 13 colleges. The data collected from these sources was subsequently analyzed using the content analysis method. The present study aimed to analyze and elucidate the notions of vision, mission, and core values as depicted on university websites, utilizing frequency values. Furthermore, it has been ascertained that the notion of openness in the strategic plans of the institutions was delineated through 10 distinct themes, each encompassing several claims. The identified themes encompass various aspects of openness within the educational context. These themes include "openness in pedagogy and open admission policies," "openness in stakeholders," "openness in technology," "openness in management-governance," "openness in sustainability," "openness in social contribution," "openness in research," "openness in global competition," "openness in ethical issues," and "openness in future predictions."

Keywords: Openness, Institutional Communication and Open and Distance Education

INTRODUCTION

In the contemporary era characterized by the prevalence of information and internet-based technologies, the incessant and expeditious evolution of information has undeniably exerted an influence on institutional frameworks, elevating the significance of communication inside these establishments. The significance of communication in open and distance education institutions, which facilitate the rapid and transparent dissemination of information to a large audience, necessitates a collective approach rather than relying solely on the efforts of an individual or department. Consequently, in order to effectively accomplish the institution's aims and objectives, it is imperative to generate the requisite information and proficiently administer the resulting information through appropriate communication strategies.

Institutional communication is a discipline concerned with communication and relationship management, encompassing various domains that seek to enhance institutional performance in accordance with the principles of sustainable development. Its ultimate goal is to transform the institution into one that is well-regarded and embraced by society (Kadıbeşgil, 2012: 159). The successful implementation of communication management within an organization relies on its ability to effectively strategize and execute plans aligned with its predetermined philosophy and goals. The identification and implementation of successful institutional strategies are crucial for ensuring the sustainability of an organization's competitive position within its relevant industry. Additionally, these strategies play a significant part in shaping the organization's overall success.

Through a comprehensive analysis of pertinent scholarly sources, it has been established that strategic planning serves as a valuable instrument for institutions, particularly in the higher education sector. This tool effectively

assists these institutions in formulating their own strategic plans, anticipating the competitive landscape within their respective environments, and strategically positioning themselves accordingly (Chen et al., 2014; Vural & Bat, 2013). Hence, it may be posited that the philosophy, vision, mission, fundamental values, and tactics of an organization serve as manifestations of the collective culture inside said organization. In essence, it can be posited that with the implementation of institutional communication management, organizations strive to consistently and interactively convey their adopted culture to all stakeholders, thereby augmenting corporate performance through the cultivation of a unified image and identity. From this perspective, it is crucial to ascertain the methods employed by Open and Distance Universities in ensuring the sustainability of their human, technological, and financial resources through the implementation of a participatory and strategic management model. This is particularly significant within the framework of fostering the philosophy of "openness", as it allows for an assessment of the present state and the formulation of a future roadmap. It is crucial to ascertain whether the influence of openness, which offers adaptable learning by prioritizing the learner, necessitates a novel educational paradigm and fresh learning proficiencies presently and in the future, as posited by Chen et al. (2014).

OPENNESS IN INSTITUTIONAL COMMUNICATION MANAGEMENT AND STRATEGIES

Institutional communication is a management function that is deliberately and instrumentally utilized by organizations (Cornelissen, 2004: 20). It encompasses a planned and applied approach within the realms of management communication, organizational communication, and marketing communication. Organizations effectively convey their core principles and beliefs to their intended recipients through institutional communication. The significance of the philosophy and mission of organizations becomes prominent in this context, as they serve as useful tools for elucidating the purpose of the organizations, delineating their objectives and undertakings, and cultivating a favorable perception in this regard (İçel, 2004:11). Management communication is a significant aspect of institutional communication, as it offers a strategic framework for connecting the vision and mission of a company with its strategic objectives (Steyn, 2003). This framework facilitates the formulation of the organization's vision, mission, strategic plan, long-term goals, and policies, which collectively establish the trajectory of the organization. Hence, the formulation of a institutional strategy within the context of management communication holds significant importance for the organization.

Institutional strategy refers to the strategic decisions and actions undertaken by an organization in order to fulfill the requirements and expectations of its stakeholders (Tokgöz, 2012: 35). The utilization of institutional communication strategies serves as a means to effectively attain the objectives of a business entity (Seitel, 2011). Currently, the primary focus for organizations in achieving effective communication with their target audiences is to ascertain the vision, mission, and goals of the organization and afterwards engage stakeholders in alignment with these objectives. Hence, the institutional communication strategy is intricately connected to the overarching objectives and extent of the organization, with the aim of fulfilling the diverse expectations and requirements of various stakeholders.

The examination of the idea of openness has been a subject of analysis within the realm of higher education for an extensive period of time. The notion of 'openness', initially examined at the UK Open University, was delineated as 'being receptive to individuals, locations, approaches, and concepts'. The facets of 'openness' were commonly examined within the context of 'open admissions' (Daniel, 2011). In the past several years, there has been an inclusion of additional elements, namely Open Access (OA) and Open Educational Resources (OER), within the framework of openness (Dhanarajan, 2012). The prominence of openness in higher education discussions has been amplified, particularly due to the widespread popularity of massive open online courses (MOOCs) (Villamejor-Mendoza, 2013). As a result, openness is gradually being embraced as the prevailing approach. In addition, several concepts such as open access, open learning design, open policy, open educational resources, open educational practices, massive open online courses, open courses, open research, and open data (Butcher & Hoosen, 2014; Weller, 2012) have been included in the framework of openness.

The concept of openness is a response to the evolving technological landscape and serves as the foundation for open universities, which aim to address the requirements of many groups and societies. Bossu (2016) argues that the notion of openness has significant implications within the educational sphere, impacting not only learners and educators but also the strategic goals and policies of university top management. Hence, this essay examines the notion of openness as a concept that influences the techniques employed by institutions and national policy.

In essence, the research objective is to ascertain the extent to which openness in higher education institutions that provide open and distance education is reflected in their vision, mission, core values, and strategies. Additionally, the study aims to determine if this level of representation establishes a novel educational paradigm and necessitates the acquisition of new learning skills.

The primary objective of this research endeavor is to ascertain the manner in which higher education institutions that provide Open and Distance Education depict the concept of openness within their respective vision, mission, core values, and strategies.

METHOD

This study is a descriptive research endeavor that aims to investigate the current state of openness in mega-universities, namely those that operate in the domain of open and distance education. The focus of this investigation lies within the context of institutional communication management. The study employed document analysis as a qualitative research method. The process of document analysis is characterized by the thorough evaluation of written materials that encompass relevant information pertaining to the occurrence or phenomenon being investigated (Yıldırm & Şimşek, 2013). Document analysis refers to the process of collecting and scrutinizing a range of written materials, papers, productions, or remnants that have been authored, prepared, or produced by individuals or institutions in relation to the subject of inquiry (Seyidoğlu, 2016). Within the framework of this study, an analysis was conducted on the vision, mission, core values, and institutional strategies of universities in the online environment, with the objective of assessing the current state of affairs.

Population and sample

The study focuses on institutions commonly known as mega-universities, which are characterized by having a student population of over 100,000. These universities offer a combination of formal education and open and distance learning, encompassing both dual and single modes of instruction (Moore, M. G., & G. Kearsley, 2011:34). Purposive sampling facilitates the selection of samples that possess a wealth of information, thereby facilitating the acquisition of knowledge by addressing key concerns that are integral to the research objectives (Patton, 1990).

The study incorporated a purposive sample strategy that involved selecting colleges based on the presence of mission statements, vision statements, core values, and strategic plans for the year 2018 and beyond, as displayed on their official websites. It is important to acknowledge, however, that the universities under analysis are representative of distinct geographical regions. The study was undertaken within the framework of this particular situation, encompassing a collective of thirteen mega institutions. The items are presented in Table 1.

Table 1: Mega universities included in the study

University	Country	Web site
Open University of Hong Hong	China	https://www.hkmu.edu.hk
Indira Gandhi National Open University	India	http://www.ignou.ac.in
Korean National Open University	Korean	https://knou.knou.ac.kr
National Open University-Taiwan	Taiwan	https://www.nou.edu.tw
University of the Philippines Open University	Philippines	https://www.upou.edu.ph
Open University of Catalonia	Spain	https://www.uoc.edu
The Open University	England	https://www.open.ac.uk
Athabasca University	Canada	https://www.athabascau.ca
Anadolu University	Turkey	https://www.anadolu.edu.tr
Universitas Terbuka (Indonesia Open University)	Indonesia	https://www.ut.ac.id
National Open University of Nigeria	Nigeria	https://nou.edu.ng
University of South Africa	South Africa	https://www.unisa.ac.za
Fern University of Hagen Fern Universität	Germany	https://www.fernuni-hagen-hims.de

(Wikipedia, 2023)

Data collection and analysis process

The study's data were acquired through an analysis of the vision, mission, core values, and strategic plans found on the websites of 13 chosen mega universities. This analysis was conducted during the period between March and April 2023.

The data obtained in the study was subjected to analysis utilizing the content analysis methodology. Content analysis involves the consolidation and interpretation of comparable facts, wherein they are synthesized within the context of a specific topic or theme and structured in a manner that facilitates comprehension for the reader (Yıldırım & Şimşek, 2013).

The content analysis performed in this study was independently coded by three faculty members who possess expertise in the domain of open and distance learning. All coders, operating autonomously, achieved unanimous agreement on the findings. The researchers employed the formula proposed by Miles and Huberman (1994) to

quantify the reliability of the study. This formula calculates reliability as the ratio of consensus to the sum of consensus and disagreement, multiplied by 1000. The researchers selected and analyzed the concepts of vision, mission, and fundamental values as presented on the websites of various colleges. These concepts were then quantitatively assessed using frequency scores. In a similar vein, the researchers examined the statements outlined in the strategic plans of the universities and discerned the elements that embodied the notion of openness. Consequently, the researchers discerned ten distinct themes and the corresponding sentences encapsulating the notion of openness.

FINDINGS

The present study elucidated the incorporation of vision, mission, and core values into the institutional communication strategies of open and distance education universities, focusing on the frequency of these ideas. Furthermore, an analysis was conducted to ascertain the representation of the notion of openness by examining and elucidating the statements found within the institutional strategies of universities. This analysis was conducted across 10 distinct themes.

Findings on the mission, vision, and core values of universities

The tables below present an analysis of the mission, vision, and core values statements found on the websites of open and distance-learning institutions, along with the frequencies of these statements

Table 2: Mission values in universities' institutional strategies

Mission Values	f
Quality open and distance education	12
Digital education	5
Lifelong learning	5
Equal opportunity in education	5
Cooperative work with business world and non-governmental organisations	4
Global education (Internationalisation)	4
Open and flexible learning	3
Focus on vocational qualifications	3
Easy access to learning environments	3
Becoming a world leader	3
Sustainable development goals	2
Access to career-oriented programmes	2
Innovative education and training	2
Learner centred learning	2
Social responsibility awareness	1
Commitment to excellence standards	1
Developing needs-based programmes	1
Increasing academic achievement	1
Resource and infrastructure update	1
Strengthening online support services	1
Providing automation in management	1
Encouraging graduates for corporate collaboration	1

Based on the data presented in table 2, it can be observed that a collective count of 23 distinct mission statements have been incorporated within the strategic plans of thirteen academic institutions that provide Open and Distance Education. Based on the findings presented, it is evident that the term "quality" (f=12) holds significant prominence within the context of Open and Distance Learning (ODL). The subsequent concepts are 'digital education', 'lifelong learning', 'equal chances' (f=5), and 'cooperation with civil society and business' and 'global education' (f=4). The least emphasised statements are 'raising awareness of social responsibility', 'commitment to excellence standards', 'developing needs-oriented programmes', 'increasing academic achievements', ' resources and infrastructure', ' strengthening online support services', 'providing automation in management' and 'encouraging alumni to institutional cooperation' (f=1)

Table 3: Visions in universities' institutional strategies

Vision values	f
Being a leader in open and flexible education	4
Open and distance education based on equal opportunity at world standards	3
Open and distance education responsive to community needs	3

University serving humanity	2
Quality higher education	2
Digital transformation in higher education	1
Information network centre	1
Caring for differences and minorities	1
Easy access to learning environments	1
Providing career planning support	1
Open and online university with international recognition	1
Transforming lives and communities	1
Providing lifelong learning service	1
Adapting learning outcomes to national development	1

Based on the findings shown in table 3, an examination of the vision statements included within the strategic plans of Higher Education Institutions (HEIs) indicated the presence of 14 distinct statements. Upon analyzing table 3, it is evident that the prevailing vision statement among ODL institutions is the aspiration to become a frontrunner in the field of open and flexible education, as indicated by a frequency of 4. The subsequent themes identified are open and distance education founded on global equal chances', 'open and distance education responsive to community needs' (f =3), university dedicated to helping mankind' and higher education of exceptional quality' (f=2). 'Digital transformation in higher education', 'knowledge network centers', 'giving importance to diversity and minorities', 'easy access to learning environments', 'providing career planning support', 'open and online universities with international recognition', 'transforming lives and societies', 'providing lifelong learning services' and 'adapting learning outcomes to national development' (f =1) emerged as other vision statements.

Table 4: Universities' core values in their institutional strategies

Core Values	f
Accountability/Honesty/Ethics	7
Inclusivity	4
Innovative	3
Perfection Excellence	3
Justice and Equality	3
Flexibility	3
Respect	2
Student Centred	2
Openness	2
Accessibility	2
Quality	2
Cooperation	2
Caring for Differences / Being Sensitive	2
Professionalism	1
Sustainability	1
Information	1
Networking	1
Relevance	1
Resolution	1
Commitment	1
Human capacity building	1
Multimodal teaching	1
Affordability	1
Lifelong Learning	1

According to table 4, the core value statements in the strategic plans of 13 higher education institutions (HEIs) highlighted a collective sum of 24 distinct values. The core value statement that received the highest attention from open and distance learning institutions was 'accountability, honesty, and ethics' (f=7), as indicated by the data. Subsequently, the terms 'inclusiveness' (f=4), 'innovation', 'excellence', 'equity' and 'flexibility' (f=3) were observed. The key values of professionalism, 'sustainability', 'knowledge', 'networking', 'relevance', 'resolution', 'commitment', 'human capacity building', 'multimodal teaching', 'affordability' and 'lifelong learning' (f =1) were highlighted less frequently.

Findings on Institutional Strategies in Universities

Upon conducting an analysis of the institutional tactics employed by Open and Distance Learning (ODL) institutions, it was observed that a total of 10 distinct themes pertaining to the concept of openness were identified. The following concepts are identified: 'pedagogical openness and open admissions', 'stakeholder openness', 'technological openness', 'management/governance openness', 'sustainability openness', 'social contribution openness', 'research and development openness', 'global competition openness', 'ethical issues openness', and 'future projections openness'.

Table 5: Statements in the theme of openness in pedagogy

Openness in Pedagogy / Open Admission Policies	f
Innovative learning (Moocs and mobile learning, digital applications)	13
Accessible learning	8
Interdisciplinary approach in education (providing programme diversity)	7
Openness in learner acceptance	5
Recognition of diplomas, certificates and other qualifications (accreditation)	5
Lifelong learning	5
Flexible learning	5
Learner centred approach	5
Building a culture of quality and new data	4
Providing learning support for disadvantaged groups	4
Multilingualism	3
Independent learning	3
Providing equal opportunity	2
Cooperative learning	2
Focus on apprenticeship training	1
Blended learning	1

Based on the findings shown in table 5, it is noteworthy that the theme of openness in pedagogy is prominently reflected in the strategic plans of Higher Education Institutions (HEIs). Specifically, the strategy statement of 'innovative learning' (f=13) stands out as a prevalent and consistent feature across all surveyed HEIs. The subsequent factors include the promotion of accessible learning (f=8), the guarantee of diverse educational programs (f=7), the acceptance of learners with an open mindset, the recognition of accreditation, the encouragement of lifelong learning, the facilitation of flexible learning and the adoption of a learner-centered strategy (f=5). The least expressed strategy in the pedagogical openness theme were 'focus on apprenticeship training' and 'blended learning' (f=1).

Table 6: Statements in the theme of openness in stakeholder

Openness in Stakeholders (Learner-Graduate)	f
Increasing academic success	4
Considering learner needs	3
Interacting with graduate	3
Increasing learner satisfaction	3
Providing career support to graduates	3
Job creation	2
Providing scholarships to learners	2
Managing learner and graduate data	1

Based on the data shown in the table, it can be observed that among the strategic plans of higher education institutions (HEIs), the statement that stood out the most in relation to openness towards stakeholders, specifically learners and graduates, was the objective of 'raising academic achievement' (f=4). Subsequently, the factors of 'responding to learner needs', 'interacting with graduates', 'raising learner satisfaction' and 'offering career support for graduates' (f=3) were observed. In this theme, 'managing learner and alumni data' (f=1) was the least expressed strategy.

Table 7: Statements in the theme of openness in technology

Openness in Technology	f
Accessibility to learning environment and resources	4
Adopting innovative technology applications	3
Continuously review technology (and adopt an evolutionary approach)	2

Streamlining data and analytics procurement	1
Training technical staff	1
Creating a digital infrastructure	1

Table 7 reveals that within the context of openness in technology, the phrase that received the highest attention across all universities was 'being available to learning environments and resources' (f=4). Subsequently, there was a pursuit of 'embracing novel technological advancements' (f=3) and 'regularly evaluating technological advancements' (while embracing a progressive methodology) (f=2). 'Streamlining data and analytics procurement', 'training technical personnel' and 'creating a digital infrastructure' (f=1) are other strategies under the theme of openness in technology

Table 8: Statements in the theme of openness in management/governance

Openness in Management/Governance	f
Transparency and visibility between the learning and teaching organisation	6
Establishing an information management system (for effective and efficient use of financial and administrative resources)	6
Collaborative governance	6
Ensuring financial sustainability	5
Creating an inclusive institutional culture	4
Digital transformation in governance	4
Improving the quality of governance	4
Clarity in the promotion of academic staff	2
Improve performance appraisal	2
Co-operation between faculties	1
Expansion of staff and teaching staff	1
Providing constructive leadership in the management team	1
Research ecosystem governance	1
Flexibility in governance	1

Table 8 demonstrates the manifestation of the theme of transparency in management and governance within the strategic plans of higher education institutions. The data indicates that the prevailing manifestation of this subject is the concept of "transparency and visibility between the learning and teaching institutions". The statements that garnered attention within this thematic framework included 'establishing a knowledge management system' and 'implementing collaborative governance' (f=6), 'ensuring financial sustainability' (f=5), 'fostering an inclusive culture', 'facilitating digital transformation in governance', and 'enhancing the quality of governance' (f=4). The least frequently mentioned strategies under this theme are 'cooperation between faculties', 'expanding staff and teaching staff', 'providing constructive leadership in the management staff', 'research ecosystem governance' and 'flexibility in governance' (f =1).

Table 9: Statements in the theme of openness in sustainability

Openness in Sustainability	f
International co-operative work	4
Ensuring financial sustainability	2
Being a research university	1
Increasing the sustainability of research	1
Providing continuous tutorial training	1
Sustainable quality improvement	1

Based on the findings presented in table 9, it is evident that the theme of openness in sustainability is prominently represented across all higher education institutions (HEIs), with a particular emphasis on the aspect of 'working in international cooperation' (f=4). Another noteworthy concept under this theme was the notion of 'ensuring financial sustainability' (f=2). In this theme, 'being a research university', 'increasing the sustainability of research', 'providing continuous tutorial training', and 'sustainable quality improvement' (f=1) are the least mentioned strategies.

Table 10: Statements in the theme of openness in social contribution

Openness on Ethical Issues	f
Public disclosure and accountability in education/training and research activities	1
To instil human values and professional ethics	1

Table 10 illustrates the manifestation of the theme of openness in societal contribution as identified in the strategic plans of the universities. The chart indicates that the emphasis on 'working with industry in vocational and applied subjects' (f=7) is present at all universities. Another statement that highlighted openness in social participation was the provision of in-service support to various industries (f=2). 'Providing physical, financial and technical resources for social contribution' (f=1) is the least mentioned strategy.

Table 11: Statements in the theme of openness in research and development (R&D)

Openness in Social Contribution	f
Collaborative work with industry in vocational and applied fields	7
Providing in-service support to different sectors	2
Providing physical, financial and technical resources for social contribution	1

Table 11 reveals that within the context of openness in research and development (R&D), the aspect of 'ensuring excellence in R&D' (f =5) is observed to be significant across all universities. Additional assertions related to this topic include 'providing external research resources', 'facilitating postgraduate education opportunities' (f =3), 'enhancing the caliber of scientific publications' and 'disseminating scientific publishing findings to the wider community' (f=3). The strategies that are least commonly employed within this particular theme include' enhancing the quality of programs', 'monitoring and updating programs', 'providing research resources within the university', 'enhancing the research skills of academic staff', 'improving the citation index', 'utilizing social networks for research purposes and knowledge sharing', 'promoting the establishment of application centres', and 'acknowledging achievements through open scholarship, data, and academic accomplishments' (f =1).

Table 12: Statements in the theme of openness in global competition

Openness in Research & Development (R&D)	f
Ensuring excellence in R&D	5
Providing external research resources (national-international)	3
Providing opportunities after postgraduate education	3
Increasing the quality of scientific publications	3
Sharing the results of scientific publications with the society	3
Ensuring interdisciplinarity	2
Increasing research capacity in niche areas	2
Improving the quality of programmes	1
Update and monitor programmes	1
Providing in-university research resources	1
Improving the research competence of academic staff	1
Citation index optimisation	1
Using social networks for research and sharing	1
Encouraging the establishment of application centres (start up innovations)	1
Recognition through open scholarships, data and academic achievement	1

Table 12 illustrates the thematic concept of openness within the context of global competition. Upon examination of table 12, it becomes evident that the subject of 'Increasing the number of approved programs (f=4) is prevalent across all Higher Education Institutions (HEIs). The concept of "expanding international exchange" (f=2) was another term used to underscore the importance of openness in the context of global competition. The strategies that were highlighted least frequently were those related to 'enhancing competitiveness and employability', 'fostering an innovative ecosystem, and 'strengthening the university's reputation and vibrancy' (f=1).

Table 13: Statements in the theme of openness in ethical issues

Openness in Global Competition	f
Increasing the number of accredited programmes	4
Expanding international exchange	2
Enhancing competitiveness and employability	1
Fostering an innovative ecosystem	1
Strengthening the university's reputation and vibrancy	1

Based on the findings presented in table 13, it is evident that within the context of openness in ethical matters, the statements pertaining to "informing the public and accountability in education, training, and research activities" and "teaching human values and professional ethics" (f=1) garnered significant attention across all universities.

Table 14: Statements in the theme of openness in future predictions

Openness in Future Predictions	f
Becoming a preferred university (branding)	4
Creating a campus life that creates a sense of belonging	3
Environmental sustainability	2
Building new and diverse campuses	2
Becoming a leader in digital literacy	2
Clarity in knowledge	2
Digital transformation	1
Increase income	1
Globalization (Internationalisation)	1

According to the data presented in table 14, it can be observed that the concept of 'becoming the university of choice' (branding) (f=4) is a topic of significance for all universities in relation to their openness to the future. Other statements that underscore the theme of openness in future forecasts include 'the cultivation of a campus community that fosters a feeling of belonging' (f=3), 'the prioritization of environmental sustainability', 'the establishment of new and varied campuses', 'the aspiration to be at the forefront of digital literacy' and 'the commitment to transparency in disseminating information' (f=2). 'Digital transformation', 'increasing income' and 'internationalisation' (f=1) are the other strategies in this theme.

DISCUSSION AND CONCLUSION
The objective of this study is to ascertain the manner in which higher education institutions offering open and distance education incorporate the concept of openness into their vision, mission, core values, and institutional initiatives. This study examines how colleges attempt to convey openness through their institutional mission, vision, fundamental values, and methods. The discussion is accompanied by a review of relevant literature.

1. Openness of Mission
In the study, an analysis was conducted on the mission statements of 13 colleges, revealing that the statement most commonly employed was "quality open and distance education." Consequently, it was found that 12 out of the total 13 universities placed a significant priority on ensuring high standards in Open and Distance Learning (ODL). Subsequently, the aforementioned concepts of 'digital education', 'lifelong learning', 'equal opportunities in education', and 'collaboration with business and non-governmental organizations' were introduced. Conversely, higher education institutions also emphasized the principles of 'open and flexible learning' and 'learner-centered learning' in their mission statements. A comprehensive examination of the pertinent scholarly works reveals that the notion of quality holds significant importance within the realm of open learning. According to UNESCO (2006), the idea of openness in learning refers to the provision of flexible learning options that liberate students from the limitations of time and place. In a separate study conducted by Angara et al. (2010), the concept of quality in open learning is defined as a learning philosophy that undergoes quality assurance processes. It emphasizes inclusivity by being accessible to individuals, employing diverse methods, and accommodating various locations and ideas. Moreover, it prioritizes flexibility and learner-centeredness, allowing learners to acquire knowledge at their own preferred time, location, and pace, tailored to their unique circumstances and requirements. The prioritization of quality underscores the commitment to addressing the unique requirements of learners by striving to eliminate any superfluous obstacles to the learning process. Hence, the focus on quality in this study aligns with the conceptualization found in existing scholarly literature and also addresses the requirements of learners through the adoption of a learner-centric strategy and the establishment of collaborative learning environments.

Conversely, the concept of lifelong learning has been identified as an additional significant objective of Open and Distance Learning (ODL). According to Jung (2005), the concept of lifelong learning pertains to the ongoing pursuit of information, skills, and values that individuals actively engage in to foster their personal and professional growth throughout the course of their lifetimes. This notion is frequently associated with the domain of adult learning. The inclusion of lifelong and flexible education in the educational missions of the universities examined in this study suggests that the educational offerings cater to individuals of all ages and backgrounds.

In a separate scholarly investigation, Gülen (2019) conducted an analysis of the mission and vision statements of EADTU and AAOU (European and Asian Open and Distance Learning Organizations). The author observed that

the most commonly employed phrases in the findings pertaining to the mission statements of these organizations included 'eliminating constraints in education', 'prominent institution', 'facilitating lifelong learning', and 'fostering global collaboration and partnership'. Based on the available data, it can be asserted that this study exhibits similarities with the conclusions of the previously mentioned study, as both studies incorporate comparable statements within the mission statements of the 13 colleges that were examined. Furthermore, the universities examined place significant importance on quality, as evidenced by the prominence of this focus in their institutional policies. The observed phenomenon can be attributed to the prioritization of delivering high-quality education to learners by open and distance education colleges.

2. Openness of Vision

Upon analyzing the manifestations of openness within the visions of Higher Education Institutions (HEIs), it was observed that the prevailing articulation often revolved around the aspiration to assume a leadership role in the realm of open and flexible education. As per the findings, it was observed that four out of the total 13 Higher Education Institutions (HEIs) placed significant focus on leadership in the context of open and distance education within their respective institutional goals. Subsequently, the aforementioned statements were presented as "Open and distance education founded on principles of equal opportunities at a global level" and "Open and distance education attuned to the specific needs of communities," followed by "A university dedicated to the betterment of humanity" and "The provision of high-quality higher education," in that order. In addition, certain higher education institutions (HEIs) underscored the importance of concepts such as the 'digital transformation of higher education', the establishment of a 'knowledge network center, the recognition and appreciation of differences and minorities, the facilitation of easy access to learning environments, the provision of support for career planning, the aspiration to become an open and online university with international recognition, the goal of transforming lives and societies, the commitment to providing lifelong learning services, and the adaptation of learning outcomes to align with national development objectives. These elements were prominently featured in the vision statements of these HEIs. It is noteworthy that several assertions included within the vision statements of Higher Education Institutions (HEIs) also encompass their missions.

Based on the aforementioned data, it is evident that the universities under examination primarily emphasize vision statements that prioritize an open and adaptable approach to distance education. Furthermore, these institutions aspire to further enhance their standing as highly esteemed and influential educational establishments. The focus on leadership bears resemblance to the findings presented in Gülen's (2019) research. While the goal of universities often emphasizes the need for leadership, the most prominent expression in their visions, namely "being a pioneering university," essentially equates to being a leader. Subsequently, the initiative of "providing open access to learning" and the implementation of a "student-friendly system" were undertaken. The survey results align with the conclusions of the aforementioned study. Furthermore, the inclusion of the concept of 'quality' within the purpose, vision, and core values of these universities serves to reinforce their commitment to upholding high standards and ensuring the quality of education in the context of open and distance learning.

The inclusion of quality in the strategic plans of universities that offer Open and Distance Education, as well as its focus in the sub-themes, signifies the significance that universities place on ensuring quality assurance across all stages of development. The institution's commitment to lifelong education and enhanced accessibility through technology is evident in their pursuit of leadership in these domains. This is reflected in their open institutional policies and strategic plans, which are openly posted on their official website.

3. Openness in Core Values

Upon analysis of the data pertaining to the core values of the study, it was determined that the prevailing expression among the core values embraced by 13 universities was 'accountability, honesty, and ethics'. As per the findings, it was revealed that seven out of the total 13 institutions expressed the significance of responsibility, honesty, and ethical standards in the context of Open and Distance Learning (ODL). The subsequent principles encompassed inclusivity, innovation, excellence, fairness and equity, flexibility, respect, student-centeredness, openness, accessibility, quality, cooperation, and caring for and sensitivity to diversity. In addition, certain higher education institutions (HEIs) have incorporated the values of professionalism, sustainability, knowledge, networking, relevance, perseverance, dedication, human resource development, multimodal teaching, affordability, and lifelong learning into their basic principles.

The study reveals that ODUs commonly incorporate core values and strategic plans that encompass accountability, transparency, pursuit of excellence, accessibility, and lifelong learning to effectively structure their higher education institutions. This suggests that these universities are striving to establish a comprehensive strategic plan with diverse applications for quality assurance and development. When examining institutional communication management from a comprehensive standpoint, it is inevitable that certain concepts, such as quality, lifelong

learning, innovation in education, accessibility, flexibility, openness, and equal opportunities for learners, will be regularly emphasized in the vision, mission, core values, and strategies of the organization.

4. Openness in Institutional Strategies

Upon analysis of the relevant literature, it becomes evident that the idea of openness is imbued with varying interpretations across many domains and contexts. This highlights the notion that the concept undergoes modifications and evolves in accordance with the surrounding circumstances. The concept of openness can be understood in different ways. Some scholars define openness as the state of being freely accessible without any technical, legal, or price barriers or restrictions on resource usage (Yuan et al., 2008). On the other hand, there are those who argue that openness encompasses a broader range of aspects, including rights, access, use, transparency, and participation (Pomerantz & Peek, 2016). According to the definition provided by Smith and Seward (2017), openness encompasses three key aspects: open production, open distribution, and open consumption. As stated by Bates (2005), the concept of openness pertains to a pedagogical approach that aims to eliminate obstacles to learning and inclusively engage individuals from all demographics, irrespective of age, marital status, or job position. From this perspective, the concept of openness entails the provision of educational opportunities to students who are unable to participate in the conventional in-person education system due to a range of factors (McAndrew, 2010; Littlejohn & Pegler, 2014). This form of openness might be characterized as enhanced accessibility (Maphosa & Bhebhe, 2020). The notion of openness has been extensively examined and defined across various domains, including pedagogy, technical accessibility, ethical use, and the philosophy and policy of education.

In a study conducted by Inamorato dos Santos et al. (2016), it was found that the Joint Research Centre of the European Commission has devised a comprehensive ten-dimensional support framework for open education that holds potential for global application. Based on the provided framework, major dimensions encompass strategy, leadership, technology, and quality, while subsidiary dimensions encompass access, content, pedagogy, recognition, collaboration, and research. The interplay between these dimensions is reciprocal, as they both enhance and constrain one another simultaneously. Therefore, the aforementioned paradigm places significant importance on enhancing teaching and learning environments through the adoption of a comprehensive approach to open education (Ossiannilsson, 2018).

This study examines the institutional tactics employed by universities that offer open and distance education. The findings reveal that statements pertaining to openness may be categorized into ten distinct themes. The identified themes encompass various aspects of openness within the context being discussed. These themes include "Openness in Pedagogy/Open Admission Policies," "Openness in Stakeholders," "Openness in Technology," "Openness in Management/Governance," "Openness in Sustainability," "Openness in Social Contribution," "Openness in R&D-Research," "Openness in Global Competition," "Openness in Ethical Issues," and "Openness in Future Predictions." The concept under consideration has been subject to several attempts at definition, spanning from the domains of pedagogy and technical accessibility to considerations of ethical use and the philosophical and policy dimensions of education.

4.1. Openness in Pedagogy

The forefront of the theme of openness in pedagogy encompasses various aspects, including innovative learning, accessible learning, an interdisciplinary approach in education to provide program diversity, learner acceptance of openness, accreditation of diplomas, certificates, and other qualifications, lifelong learning, flexible learning, and a learner-centered approach.

The findings indicate that there is a strong correlation between the adoption of pedagogically innovative approaches, such as utilizing MOOCs or mobile learning applications, and the strategies employed by universities offering open and distance education. This correlation is particularly evident in relation to the second key aspect, which is the accessibility of education. The concept of accessibility encompasses various dimensions such as innovation, independence, flexibility, and lifelong learning, particularly in the context of contemporary technologies.

According to Bozkurt (2019), open pedagogy encompasses the information processes, particularly inside online networks and network society, that align with contemporary advancements in technology. Consequently, this notion has gained significance in the present era of digital information.

In his recent scholarly work, Lee (2021) conducts a comprehensive analysis of the historical aspects surrounding the two discourses pertaining to openness and innovation within the realm of online higher education. The emergence and evolution of the discourses surrounding openness and innovation at Athabasca University (AU)

can be traced back to its initial mission statement in 1985. One of the long-term strategies proposed in this statement was the belief that the integration of innovative pedagogy and suitable educational technologies could be achieved. The AU model, which grants learners ongoing access to AU courses and empowers them to design their own learning programs within these courses, was regarded as highly novel and innovative upon its initial adoption. By 2015, the notion of being innovative had come to encompass the utilization of innovative pedagogy and appropriate educational technologies.

In Villamejor-Mendoza's (2013) study, the focus is placed on the incorporation of open learner acceptance into pedagogy, similar to the present study. Villamejor-Mendoza conducted a study on the openness of the Open University of the Philippines (UPOU) with the objective of not only identifying the constituent elements of openness but also elucidating the underlying causes and potential remedies for the issues and challenges that impede the university's ability to fully embody the principles of openness. To establish a comprehensive framework, Villamejor-Mendoza relied on four distinct parameters of openness. The aforementioned concepts encompass open admissions, open curricula, scaled distant education, and the imperative to collaboratively develop, disseminate, and employ open educational resources (OER). However, it is worth noting that the adoption of Open Educational Resources (OER) has been associated with the potential for improved pedagogical methods as well as facilitating learner-centered and personalized learning (Pawlyshyn et al., 2013; Weller, 2014).

Another aspect highlighted in the study is the promotion of openness in pedagogy, specifically in terms of learner acceptance, which encompasses diversity and collaborative learning. In the present investigation, Tietjen and Asino (2021) underscored the significance of fostering learner diversity and cultivating a collaborative learning culture as integral components of open pedagogy.

Upon collective analysis of the statements pertaining to the theme of openness in pedagogy, it becomes evident that they bear resemblance to the findings of previous research conducted within this domain.

4.2. Openness to Stakeholders
In the domain of stakeholder transparency, the statement that received the highest level of emphasis was 'enhancing academic achievement'. Additionally, other statements that were strongly emphasized include 'attentiveness to the needs of learners', 'engagement with graduates', 'enhancement of learner satisfaction', 'provision of career assistance for graduates', 'generation of employment opportunities', 'provision of scholarships for learners', and 'management of learner and graduate data'.
 graduate

Based on the aforementioned statements, it can be inferred that Open and Distance Education providers prioritize the success and satisfaction of learners and graduates, who are considered internal stakeholders, as a central focus in their strategic plans. To attain this objective, institutions recognize the significance of implementing a framework that incorporates institutional approaches capable of catering to the needs of learners while also offering interactive and career support. The universities' adoption of these strategies might be perceived as evidence of their commitment to cultivating graduates who possess a strong foundation in scientific knowledge and practical experience, enabling them to effectively address the demands of the job market and thrive in competitive professional environments.

Open and distance education universities rely on the involvement of various stakeholders, such as students, professors, faculties, institutions, regions, nations, and the global community, in order to enhance their open pedagogy approach (Kirkwood & Price, 2016; Ossiannilsson et al., 2015). Nevertheless, it is imperative for academic institutions offering distance education to effectively cater to their students by offering diverse strategic program outcomes, all the while making efforts to retain them within the educational system. Furthermore, it is imperative that educational institutions have the capacity to provide job opportunities for their students, enabling them to apply their acquired skills and knowledge in their respective fields of expertise (Barney, 1991). Warren and Churchill (2022) conducted a study that demonstrated the potential impact of universities on their competitors. The authors found that colleges have the ability to strategically plan their success and preference rates by considering the rates at which their graduates are placed in the labor force.

4.3. Openness in Technology
The expressions pertaining to the theme of openness in technology encompassed various aspects, including the facilitation of accessibility to learning environments and resources, the adoption of innovative technology applications, the ongoing evaluation and assessment of technological advancements, the facilitation of data and analytical provision, the training of technical personnel, and the establishment of digital infrastructure.

Technology has enabled learners to access teaching and learning settings and resources at their convenience, regardless of time and location. The utilization of diverse technologies in progressive pedagogical methodologies has revolutionized the comprehension of teaching and learning, prioritizing the learner and the process of learning within the educational framework. Consequently, this has led to the development of instructional techniques that incorporate novel forms of interaction.

The concept of accessibility is characterized by the absence of impediments, including those of a legal, economical, and geographical nature. From this perspective, it can be argued that open and distance learning play a significant role in enhancing education by overcoming limitations related to time and geography. To comprehend the influence of online learning on accessibility, it is crucial to examine the evolution and advancement of this technological framework (Geith & Vignare, 2007).

According to Khan (2005), the utilization of the Internet and Internet-based technologies can facilitate e-learning within a setting that is open, flexible, and distributed. However, Khan highlights the importance of integrating pedagogy with technology, as technology alone is insufficient to establish a meaningful learning environment. Additionally, it is crucial to comprehend how the distinct capabilities and attributes of various technologies can be effectively employed to facilitate different types of learning for specific content. The current implementation of distance education heavily relies on online platforms. The enthusiasm surrounding online education stems from the potential afforded by the Internet and its associated technologies for the generation, preservation, dissemination, and exchange of information. Computers and the Internet, which are products of information technologies, are often regarded as essential auxiliary instruments in maintaining the continuity of education. The utilization of these technologies not only guarantees the uninterrupted progression of education but also gives rise to novel pedagogical approaches. Furthermore, this approach facilitates the customization of learning experiences, enabling students to progress at their own pace and according to their own abilities (Süral, 2008). From this perspective, it is arguable that open and distance education are reliant on technology-focused comprehension for their advancement and long-term viability.

The concept of flexibility is closely associated with the accessibility of teaching and learning environments and resources. The explanation of flexible learning encompasses four fundamental components, namely pedagogy, practice, organization, and technology (Collis & Moonen, 2002). Conversely, it is imperative that flexible learning hold significance not only for learners but also for all stakeholder groups within the system. For instance, attributes such as convenient accessibility, thoughtfully crafted content, a learner-centric approach, cost-effectiveness, and others suggest that the flexible learning system holds significance for the student. The meaningfulness of flexible learning for course instructors is also derived from the high level of engagement and achievement exhibited by learners in achieving the course aims and objectives. Likewise, the effective utilization of the support services offered brings about satisfaction among the support personnel (Morrison & Khan, 2003). Furthermore, the availability and accessibility of various technologies are crucial for the development and implementation of innovative learning models.

4.5. Openness in Managing/Governing

The primary focal points within the context of openness in management/governance include the concepts of transparency and visibility between the learning and teaching institutions, the establishment of an information management system that optimizes the utilization of financial and administrative resources, and the implementation of collaborative governance. The aforementioned statements encompass various aspects of academic governance, including the pursuit of financial sustainability, the establishment of an inclusive institutional culture, the implementation of digital transformation in governance processes, the enhancement of governance quality, the promotion of transparency in the academic staff promotion process, the improvement of performance evaluation mechanisms, the facilitation of collaboration between different faculties, the expansion of staff and teaching resources, the cultivation of constructive leadership among management personnel, the effective management of the research ecosystem, and the incorporation of flexibility in governance practices.

Cronin (2017) underscored the importance of implementing evidence-based policies and fostering a collaborative and critical mindset towards openness in order to effectively support faculty, students, and the learning process within the ever-evolving landscape of higher education. To establish an effective university system and management model, it is imperative for the institution to engage in collaborative efforts with all relevant stakeholders, including those with direct and indirect affiliations. Developing open and transparent management approaches that are accountable to stakeholders is considered highly significant (Aktan, 2007).

According to Ellram et al. (2007), the successful implementation of any educational service necessitates the clear definition of work activities and the identification of accountable human resources, as well as the determination of

the specific locations and timeframes for their execution. According to Damodaran (2009), it is crucial for action plans in higher education to incorporate metrics that can assess the effectiveness of human resource utilization as well as ensure prudent budgeting for sufficient human resources. Hence, in order to ensure the effectiveness and efficiency of open and distance education applications, it is important to engage in strategic planning, similar to other organizational frameworks.

The implementation of a successful and efficient distance learning strategy necessitates the utilization of systems thinking by organizational managers (Hoyland et al., 2014). This approach enables them to comprehend the intricate interconnections among individuals, tools, pedagogy, and activities. By doing so, it may be ensured that an organization's facilities, technologies, and human resources are adequately prepared to assist instructors and students who may have difficulties utilizing novel tools and modalities. Collaboration is a crucial aspect of strategic planning in the realm of distant education, wherein decision-makers are encouraged to actively engage with and take into account the perspectives and insights of stakeholders possessing extensive expertise and information pertaining to the system in question. In order to ensure effective implementation of a distance education plan, it is imperative to engage in good practice by actively listening to the perspectives and insights of the staff and faculty involved. Although this endeavor may take a substantial amount of time and perhaps necessitate substantial modifications to current processes and services, the process of gathering this information should ultimately lead to the development of distance education programs that effectively utilize the institution's capabilities and resources.

In the context of open and distance education universities, the implementation of transparent and open management/governance practices is imperative. This is crucial for enhancing learner-instructor and institutional satisfaction, ensuring financial sustainability, augmenting student participation, and improving the quality of education (Warren & Churchill, 2022).

4.6. Openness in Sustainability

Within the context of sustainability, the concept of openness was prominently highlighted, with particular emphasis placed on "international collaborative work". This was closely followed by the imperative of "ensuring financial sustainability", as well as the aspiration of being recognized as a research university. Additionally, there was a strong focus on enhancing the sustainability of research practices, along with a commitment to providing ongoing training for instructors to ensure their continuous development. Lastly, the pursuit of "sustainable quality improvement" was identified as a key objective within this framework.

The aspiration of open and distance education colleges to achieve sustainability in international collaborative studies aligns with their objective of attaining global leadership in education and garnering recognition. According to Walker (2005), the concept of openness encompasses several key attributes, including convenience, effectiveness, affordability, sustainability, and accessibility, with the aim of benefiting students and educators on a global scale. Within this particular framework, the viability of various forms of open educational resources for the facilitation of teaching and learning is regarded as a crucial element in the establishment, durability, and authoritative position of an institution.

In a study conducted by Farisi (2013), an examination was made into the growth, goals, accessibility, and durability of Open Educational Resources (OER) within the official websites of major Asian universities. The study highlighted that these universities employ sustainability models, namely institutional, formal, user-centric, and revenue-based approaches, which are aligned with the universities' characteristics and policies. These models are implemented to ensure the long-term viability and stability of OER initiatives. The primary concern associated with Open Educational Resources (OER) is sustainability, which refers to the long-term viability and stability of the OER program in light of limited financial resources (Dholakia, et al., 2006; Downes, 2006; Wiley, 2007). Therefore, it is well acknowledged that relying solely on incentives for the sustainability of open educational resources is insufficient (Wiley, 2007). Furthermore, relying solely on open educational resources is insufficient for achieving sustainability in education. To ensure long-term viability, it is imperative to integrate ideas from various interdisciplinary domains, encompassing educational and business perspectives across different disciplines, alongside educational resources. Furthermore, it is imperative that national and worldwide collaborative research endeavors in the realm of open and distance education make significant contributions towards the goal of sustainability.

4.7. Openness in Social Contribution

The primary focus in promoting openness in social contribution lies in collaborative engagement with industry partners in vocational and practical domains. This statement was subsequently accompanied by the provision of

in-service support to various sectors and the allocation of physical, financial, and technological resources for the purpose of social contribution.

The indicators that universities offering open and distance education adopt innovative, cooperative, and practical education policies include their commitment to working in collaboration with the industry in vocational and applied fields, offering in-service support to various sectors, and providing physical, financial, and technical resources for social contribution.

According to Yuan and Powell (2013), the concept of openness encompasses the provision of chances for the exchange of ideas, the establishment of connections, and collaboration among both local and international institutions, educators, and students. Additionally, openness facilitates a more profound engagement in the processes of teaching and learning. Consequently, the influence of openness will necessitate the adoption of a novel educational paradigm and the acquisition of new learning skills in the forthcoming era.

4.8. Openness in Research and Development (R&D)

The predominant focus within the context of research and development (R&D) pertained to the concept of openness, with a particular emphasis on the provision of exceptional quality in R&D endeavors. The aforementioned statement was accompanied by several objectives, including the provision of external research resources at both national and international levels, the facilitation of post-graduate opportunities, the enhancement of scientific publication quality, the dissemination of research findings to the wider society, the promotion of interdisciplinary collaboration, the development of research capacity in specialized areas, the improvement of program quality, the regular updating and monitoring of programs, the provision of research resources within the university, the enhancement of research competence among academic staff, the improvement of citation indices, the utilization of social networks for research purposes and knowledge sharing, the encouragement of the establishment of application centers for innovative startups, and the promotion of open scholarship, data sharing, and recognition based on academic achievements.

The significance of research and innovation in bolstering a nation's economic and social fabric cannot be overstated, with universities occupying a central position in the cultivation of human capital through these endeavors (Ivey et al., 2013). Hence, it is widely recognized that educational institutions that fail to engage in research and neglect to stay abreast of advancements and innovations will fall behind in their ability to effectively respond to competition and the demands of global education. Within this particular setting, the aspiration to establish oneself as a prominent institution of higher learning with a specific emphasis on technology and research remains a highly prioritized concern among open and distance education establishments (Altınpulluk, 2019).

Upon analyzing the mission, vision, and core values outlined in the strategic plans of the open and distance education universities under investigation, it becomes evident that the majority of these institutions aspire to become universities that prioritize and emphasize the establishment of a success-oriented, high-quality educational environment. Additionally, they strive to foster a culture of continuous research utilizing cutting-edge technologies while also focusing on development, innovation, and the broad dissemination of knowledge to a wide range of individuals.

4.9. Openness in Global Competition

The aforementioned assertions regarding the augmentation of accredited programs, the expansion of international exchange, the enhancement of competitiveness and employability, the establishment of an innovative eco-system, and the aspiration to become a robust, dynamic, and esteemed institution, as frequently underscored within the framework of openness in global competition, can be construed as indicative of the perpetual pursuit of open and distance education universities to possess an international and intercultural orientation. Moreover, these institutions formulate strategic plans centered around competition with the aim of augmenting the diversity of academic knowledge and information accessed and disseminated, leveraging their evolving technologies.

In contemporary circumstances, education has emerged as an integral component of the globalization phenomenon, highlighting the significance of the internationalization aspect of education. The concept of internationalization, particularly in the context of higher education, refers to the deliberate incorporation of an international or intercultural element into the realms of teaching and research (Knight, 2006). From this perspective, the significance of internationalization in the context of open and distance education applications that transcend geographical boundaries and constraints becomes increasingly apparent. This is due to the fact that, in order to keep pace with global advancements, fostering collaboration and establishing partnerships can only be achieved through the process of internationalization. However, it is important to note that the internationalization of higher education encompasses more than just student mobility (Marmolejo, 2011). It also involves the

integration of institutional resources into international partnerships and collaborations, with the aim of generating scientific knowledge and addressing societal challenges.

4.10. Openness on Ethical Issues

The focal points of openness in ethical matters were the assertions of the dissemination of information to the public as well as the promotion of accountability in educational, training, and research endeavors. Additionally, there was a notable emphasis on the cultivation of human values and professional ethics.

The inclusion of openness in ethical matters serves as a fundamental element that enhances the level of transparency within institutions, bolstering their accountability and, subsequently, their dependability. Openness in ethical matters encompasses various components, encompassing research pertaining to the educational and training endeavors of the institution as well as the dissemination of information to society and the utilization of open educational resources. In the context of open and distance higher education institutions, where open educational resources are commonly employed, it is evident that institutions bear an augmented ethical responsibility. This is due to the fact that the content can be easily replicated and disseminated globally through electronic means, incurring minimal expenses. Given the ease and cost-free availability of open educational resources and educational opportunities (Caswell et al., 2008), it is imperative that we place heightened emphasis on ethical considerations.

4.11. Openness in Future Predictions

The statement that received the most attention within the context of openness in future projections was "achieving the status of a preferred university through effective branding." Subsequently, the institution aimed to establish a campus environment that fosters a strong feeling of inclusivity and community, prioritize ecological responsibility, construct novel and diversified campuses, assume a prominent role in promoting digital literacy, embrace a culture of knowledge sharing, undergo a digital transition, enhance revenue generation, and actively pursue internationalization efforts.

The prominence of the issue of openness in future projections underscores the inclination of open and distant education universities to prioritize this aspect in their strategic goals. This assertion suggests that the consideration of student expectations and satisfaction should be a crucial component for institutions and instructors when formulating policies. The concept of openness encompasses the strategies and initiatives undertaken by these universities to foster growth, progress, and global reach. This is achieved by focusing on being highly regarded, assuming leadership roles, and embracing internationalization. The metric of success and sustainability for educational institutions is the increase in student enrollment. Therefore, while conferring a competitive edge in the realm of higher education, it can also serve to ameliorate the financial circumstances of the academic department that is experiencing a state of preference. According to Warren and Churchill (2022), the rise in student enrollments has prompted academic departments to pursue a competitive edge by strategically allocating their various resources, such as faculty expertise in pedagogy or research, as well as their utilization of technology. This allocation aims to enhance the delivery of educational products or services in a more efficient manner compared to rival institutions. Additionally, it is asserted that the strategic development of systematic distance education programs, which offer superior effectiveness and efficiency compared to other institutions, might confer a competitive edge in the higher education sector. This benefit, in turn, will contribute to enhancing the financial position of the academic division.

Open and distance education have historically been associated with the provision of educational opportunities to individuals who, due to various circumstances, are unable to participate in conventional in-person educational settings (McAndrew, 2010; Littlejohn & Pegler, 2014). Nevertheless, the incorporation of contemporary digital technology into distance education systems has resulted in enhanced accessibility across all domains (Maphosa, 2020). Hence, it is imperative for universities offering open and distance education to be strategically structured in order to enhance the educational experience for prospective learners. This may be achieved by delivering distinct advantages compared to traditional face-to-face programs, with a particular emphasis on harnessing the potential of digital transformation. The implementation of well-structured and strategic distance education programs, along with judicious selection of technology resources, can confer a competitive edge in the higher education sector and make a substantial contribution to institutional branding.

In conclusion, the effectiveness of open and distance higher education institutions' tactics will be assessed based on the enrollment of students in subsequent years, serving as an indicator of the extent to which the service aligns with their perceived value.

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Examining the Relationship Between Teachers' Professional Development and Self-Efficacy: TALIS 2018 Turkey Case

Şule ÖTKEN
Dr., Ministery of Education, Ankara, Turkey
sule.ayyildiz@hotmail.com
ORCID: 0000-0003-2454-6449

ABSTRACT
In this study, the teacher questionnaire included in the TALIS 2018 Turkey application was used. It was aimed to investigate the relationships between the sub-dimensions of teacher professional development and teacher self-efficacy scales in the questionnaire. The sub-dimensions of the teacher self-efficacy scale were grouped into three dimensions: self-efficacy in classroom management, self-efficacy in teaching, and self-efficacy for student engagement. The teacher professional development scale has four dimensions: effective professional development, professional development needs in subject matter and pedagogy, professional development needs for teaching for diversity, and professional development barriers. The data obtained from 10198 participants were tested using the relational research model. Canonical correlation analysis was applied to the data obtained from the research. According to the findings, there is a significant (p<.05) and positive relationship between teachers' professional development and self-efficacy. In addition, according to the explained variance values, the first set shares 3% of the variance and the second set shares 1% of the variance. The recommendations made based on the results are to encourage teachers' communication and collaboration with each other and to increase teachers' professional development by supporting teachers to learn more. Policy practitioners can give teachers a say in matters such as choosing textbooks and teaching formats. They can support student and teacher psychology and create a system of professional counseling to solve problems. In future research, different variables in the TALIS survey can be used with different analysis methods.
Keywords: Teachers, Teachers' self-efficacy, Teachers' Professional development.

INTRODUCTION
The teaching profession is a professional occupation that requires academic study and professional formation together with specialized knowledge and skills in social, cultural, economic, scientific and technological fields related to the education sector. Teachers have to fulfill these duties in accordance with the general aims and principles of National Education (Dağlıoğlu, 2020, p.73). The teaching profession has been recognized as a model for other professional sectors, aiming for universal and lasting learning opportunities for individuals in societies. High quality feeders are necessary to ensure effective effects via national school systems. As a result for sustained globalization to be of "high quality," orderly options are needed to distribute diversity competencies (Barrera-Pedemonte, 2016). The professional development and self-efficacy of these teachers is also important for achieving high quality education in schools.

Teacher self-efficacy and professional development are two important concepts that are often associated with teacher performance and student learning. In light of school reforms focused on improving teacher quality as a result of effective schools, it is becoming clear that there is a need for professional development programs or activities designed to improve teacher quality (Gümüş & Bellibaş, 2021). Professional development has long been seen as a mechanism for developing and sustaining teachers' professional knowledge, and it is recognized that pre-service and master's degrees have a limited lifespan. However, approaches to teacher professional development often fall short of providing teachers with the learning they need to improve their practice and student learning at different points in their professional careers (Fairman et al., 2020). Professional development can provide a variety of learning activities to support teachers to apply what they have learned to their own practice and solve problems in their own classrooms. Thus, through professional development, teachers are provided with a space to relate their knowledge about a particular program and its goals to the practice they experience in the classroom (Farrov, Kavanagh, & Samudra, 2022).

Teachers' self-efficacy
Teacher self-efficacy is related to teachers' beliefs about the extent to which they can influence student learning in general (Cantrell & Hughes, 2008). Goddard et al. (2004) found that there is a positive correlation between teaching effectiveness and self-efficacy when teachers are confident about their profession and change their behaviors in ways that contribute to student learning. Moreover, according to Stein and Wang (1988), strong

teacher efficacy is often associated with effective classroom behaviors and positive student outcomes. On the other hand, teachers with low levels of self-efficacy will be less motivated to exert effort during teaching and will show lower levels of persistence. The concept of teacher self-efficacy is not an all or nothing concept. Therefore, teachers may have different levels of self-efficacy (Powell-Moman & Brown-Schild, 2011, p.48). The use of teacher self-efficacy as a concept through which teacher in-service training can be designed and evaluated offers a viable and promising means to move towards this goal (Clark & Bates, 2003). Therefore, it can be said that these in-service trainings will significantly increase the professional development of teachers.

Teachers' professional development
In many studies in the literature, teachers' professional development has been associated with teacher quality, student learning, teaching quality and student outcomes (Masters, 2003; Meiers & Ingvarson, 2005; Yates, 2007). Teachers' professional practices are strong sources of efficacy knowledge that increase beliefs that influence how they conceive of themselves in creating favorable environments for their students. (Tran, 2014, p.90 Curriculum-oriented professional development and collaboration in particular represent characteristics that are more directly associated with diversity in teachers' practice (Barrera-Pedemonte, 2016). On the other hand, in order to increase teachers' professional development, it is necessary to increase their self-efficacy (Kaya, 2021). Developing research on the effects of professional development activities on teachers' self-efficacy with such comprehensive data can help to understand the diversity in professional development opportunities for teachers in different countries around the world (Gümüş & Bellibaş, 2021). This study aims to examine the relationship between teachers' professional development and self-efficacy. Investigating this relationship is important because it also affects student achievement in schools. Therefore, it is thought to contribute to the related literature.

THE STUDY
In this research, the research model, participants, data collection tools and data analysis are presented in this section.

Research model
In this study, the relational research model was used since it was aimed to examine the relationship between teachers' professional development and self-efficacy. The relational research model enables the investigation of the relationships between two or more variables (Fraenkel & Wallen, 2006).

Participants
In this study, the data set shared on the OECD website and including teacher-level data was used. This data set was limited to include only participants from Turkey. The participants identified within the scope of the study consisted of teachers who participated in the TALIS 2018 Turkey survey. After deleting the missing data, the data obtained from the remaining 10198 respondents were used. Of these, 52.3% were female and 47.7% were male.

The schools identified in TALIS 2018 were determined by the OECD using a two-stage sampling method. It is a two-stage sampling as first a sample of schools is selected and then a representative sample of teachers is sampled from each selected school. The design weighting for teacher data therefore has two components, one allowing for expansion from the single teacher to the school and the other allowing for integration from the school to the country (OECD, 2019).

Data collection tools
In this study, the teacher professional development scale and the teacher self-efficacy scale in the TALIS 2018 survey were used for the purpose of the research.

Teacher Self-Efficacy: In the TALIS 2018 questionnaire, the teacher self-efficacy scale has 12 items collected in three dimensions: teachers' self-efficacy in classroom management (T3SECLS), self-efficacy in teaching (T3SEINS), and self-efficacy for student engagement (T3SEENG). The items are rated from "1 = never" to "4 = very often" (OECD, 2019).

Teacher Professional Development: In the TALIS 2018 survey, there are 19 items in four dimensions of the teachers' professional development scale: effective professional development (T3EFFPD), professional development needs in subject matter and pedagogy (T3PDPED), professional development needs for teaching for diversity (T3PDIV), and barriers to professional development (T3PDBAR). The "Effective professional development" dimension is "Yes" (1) and "No" (2), the "Needs for professional development in subject matter and pedagogy" and "Needs for professional development for teaching for diversity" dimensions are "No need at

present" (1), "Low level of need (2)", "Moderate level of need" (3), "High level of need" (4) and finally "Professional development barriers" dimension is answered as "Strongly disagree" (1), "Disagree" (2), "Agree" (3), "Strongly agree" (4) (OECD, 2019).

Data analysis
In order to explain the relationship between teachers' professional development and self-efficacy determined in line with the purpose of the study, canonical correlation analysis was used with the statistical package program for social sciences (SPSS). According to Tabachnick and Fidell (2007), canonical correlation analysis is used to examine the relationship between two sets of variables. In canonical correlation analysis, there are multiple predictor variables and outcome variables (Kline, 2011). In canonical correlation, the relationship is examined by finding a linear combination of Y variables and a linear combination of X variables such that the scores obtained from the Y combination are maximally correlated with the scores obtained from the X combination (Marcoulides & Hershberger, 1997).

The assumptions of canonical correlation analysis are normal distribution, multicollinearity and linearity (Kalaycı, 2014). Correlation values were calculated for the presence of multicollinearity among the variables (Büyüköztürk, 2009) and it was observed that there was no multicollinearity among the variables. In addition, skewness and kurtosis values were examined for the normality of the data set and it was concluded that it showed a normal distribution (Büyüköztürk, 2009) since it was in the range of (-1, +1).

The variable sets used in the research are teacher self-efficacy and teacher professional development. Teacher self-efficacy scale has 3 sub-dimensions and teacher professional development scale has 4 sub-dimensions. The model established for canonical correlation analysis is given in Figure 1.
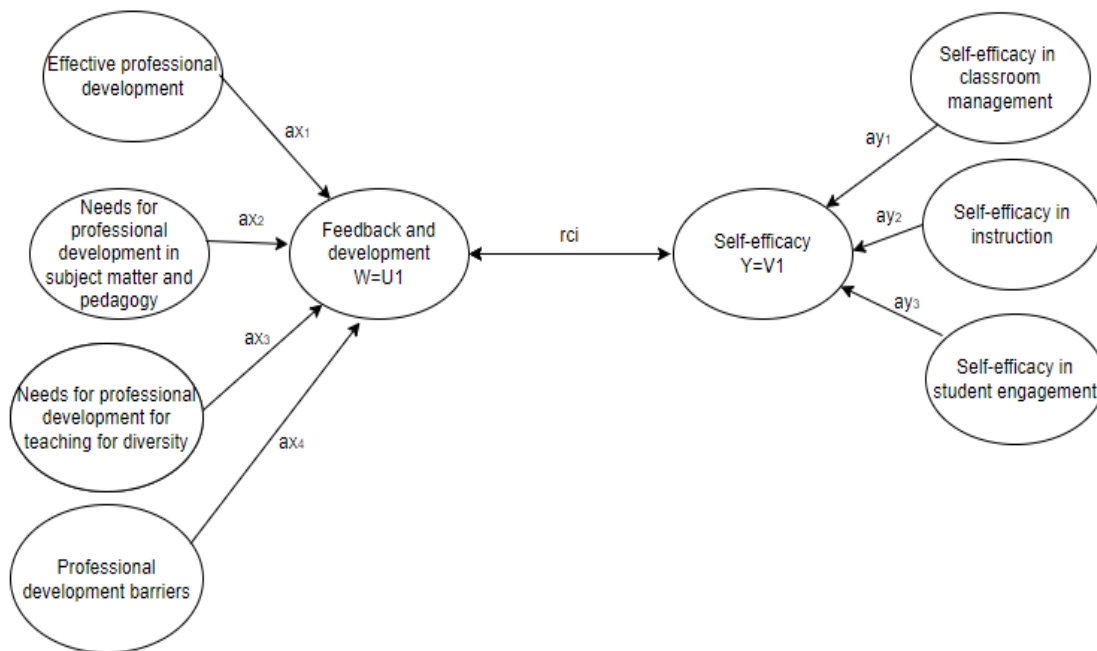
Figure 1: Conceptual model for canonical correlation analysis

Figure 1 shows the conceptual model of the variable sets determined within the scope of the research. Accordingly, axi and ayi indicate canonical loadings, and rci indicates the correlation value.

FINDINGS
The mean, standard deviation and correlation values of the variables determined within the scope of the research are given in Table 1.

Table 1: Descriptive statistics and correlation values of variables

Variables	Mean	Std.dev.	1	2	3	4	5	6	7
Effective professional development	13,47	2,80		-,15**	-,08**	-,04**	,09**	,11**	,12**
Professional development barriers	8,98	2,06			,22**	,19**	-,11**	-,12**	-,12**
Need prof. devel. for teaching for diversity	9,76	2,48				,49**	-,16**	-,19**	-,20**
Need prof. devel. in subject matter and pedagogy	9,38	2,12					-,19**	-,21**	-,21**
Self-efficacy in classroom management	12,66	2,03						,66**	,69**
Self-efficacy in instruction	12,62	2,16							,71**
Self-efficacy in student engagement	12,13	2,18							

*:p<.01

When the correlation values related to teachers' self-efficacy and teachers' professional development were examined in Table 1, it was concluded that the highest correlation value was between "Need professional development in subject matter and pedagogy" and "Self-efficacy in student engagement" sub-dimensions (r= -.20; p<.01). But, the lowest correlation value was found between "Effective professional development" and "Self-efficacy in classroom management" (r= .09; p<.01). It was concluded that these correlation values were significant (p<.01).

The canonical correlation analysis results of the variable sets are given in Table 2.

Table 2: Canonical correlation analysis results for variables

Roots	r_c	r_c^2	Eigenvalues	Wilks' Lambda	F	df	p
1	,28	,09	,99	,74	12,00	26963,14	,00
2	,04	,00	,92	,28	6,00	20384,00	,09

Table 2 shows that the first canonical variable pair is significant (Wilks' Lambda=74.53; F=12.00, p<.05). When the correlation values of the canonical variable in question were examined, it was calculated as .28. According to the square of this value, we conclude that the first pair of canonical variables accounts for 9% of the variance. Wilks's Lambda, the ratio of within-group variability to total variability on the discriminant variables, is an inverse measure of the significance of the functions. Values close to 1 indicate that almost all of the variability in the discriminant variables is due to within-group differences (differences between cases in each group); values close to 0 indicate that almost all of the variability in the discriminant variables is due to group differences (Tinsley & Brown, 2000). According to the Wilks' Lambda value obtained within the scope of the research, it shows that very little of the variability in the first function is due to differences between groups. However, eigenvalues show the ratio of between-group variability to within-group variability for a function. The larger the eigenvalue, the better the discriminant variables loaded on the function explain group differences (Tinsley & Brown, 2000). According to the eigenvalues given in Table 2, it can be concluded that the first function explains the within-group variability better. As a result of the canonical correlation analysis, the correlation coefficients and canonical loadings of the variables in the sets are given in Table 3.

Table 3: Correlation coefficients and loadings of variables

Variables	r_{c1}	
	Correlation coefficient	Canonical Loadings
First set		
Effective professional development	-,35	-,44
Professional development barriers	,21	,46
Need prof. devel. for teaching for diversity	,41	,75
Need prof. devel. in subject matter and pedagogy	,55	,80
Variance explained	,03	
Second set		
Self-efficacy in classroom	-,09	-,77

management		
Self-efficacy in instruction	-,48	-,92
Self-efficacy in student engagement	-,52	-,93
Variance explained	,01	

When Table 3 is examined, according to the explained variance values, the first set shares 3% of the variance and the second set shares 1%. In addition, according to the canonical loadings, it was calculated that the most important contributing variable was "Self-efficacy in student engagement" (-93%). On the other hand, the lowest contributing variable was found to be "Effective professional development". However, the fact that the canonical loadings are greater than .30 (Tabachnick & Fidell, 2007) shows that it is a part of the variable set in question. Accordingly, it is seen that the variable "Professional development barriers" is not a part of the first set (.21). In addition, it was concluded that the variable "Self-efficacy in classroom management" was not a part of the second set (-.09). The canonical loadings values of the canonical correlation analysis and the correlations between the variables are given in Figure 2.
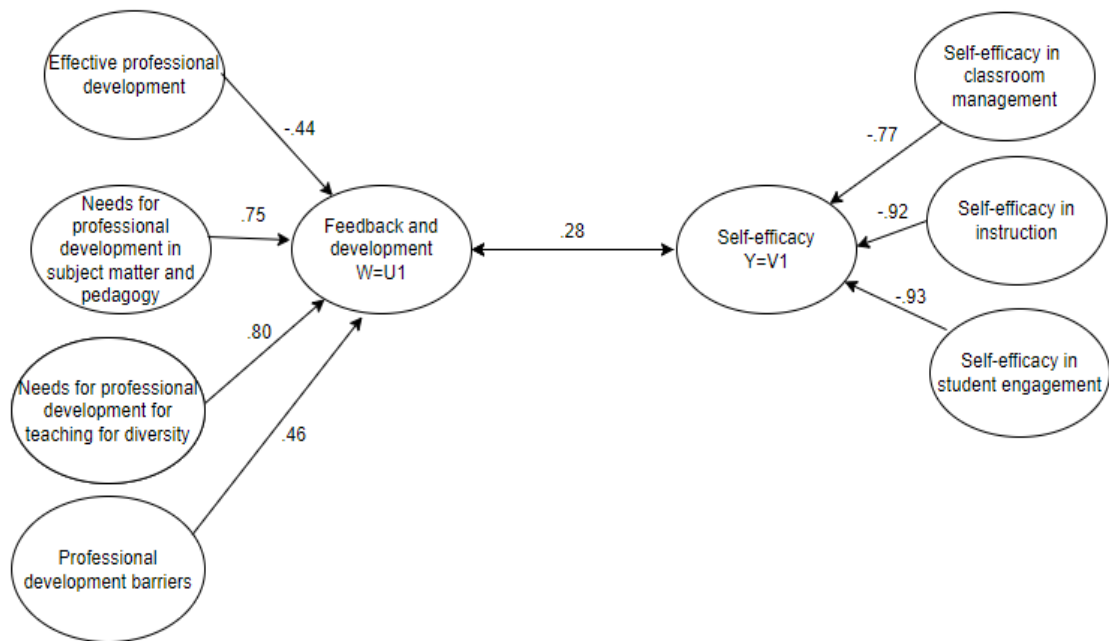
Figure 2: Canonical loadings and correlation value of variable sets

Figure 2 shows the canonical loadings and correlation values of the variable sets of teachers' professional development and self-efficacy. There is a significant (p<.05) and positive relationship between these variable sets.

CONCLUSIONS
The aim of this study is to examine the relationship between teachers' professional development and self-efficacy. For this purpose, canonical correlation analysis was conducted. According to the findings, it was concluded that the highest correlation value related to teachers' self-efficacy and teachers' professional development was found between "Need professional development in subject matter and pedagogy" and "Self-efficacy in student engagement" sub-dimensions. When the related literature is examined, it supports the findings obtained. For example, according to Borko (2004), increasing teachers' professional development programs in the subject area and having experiences that enable teachers to attend in activities such as solving mathematical problems and conducting scientific experiments as learners play an effective and important role in increasing self-efficacy beliefs in student engagement. In addition, Woods and Weasmer (2004) concluded in a study that increasing teaching performance in teachers' professional development positively affects student engagement and increases teacher self-efficacy.

According to the Wilks' Lambda value obtained within the scope of the research, it shows that very little of the variability in the first function is due to intergroup differences. However, the first canonical variable pair was found to be significant. In addition, according to the explained variance values, the first set shares 3% of the variance and the second set shares 6%. In addition, according to the canonical loadings, it was calculated that the

most important contributing variable was "Self-efficacy in student engagement" (-93%). On the other hand, the lowest contributing variable was found to be "Effective professional development". Barrera-Pedemonte (2016), in a study conducted on the TALIS 2013 application, concluded that teachers with high professional development contribute to student achievement by increasing students' learning in the classroom. The increase in student achievement also affects teacher self-efficacy. In addition, professional development programs not only provide teachers with new knowledge and skills, but also allow them to spend time on practices that will enable students to actively participate in the lesson (Meiers & Ingvarson, 2005).

nother finding of the study is that there is a significant (p<.05) and positive relationship between the variable sets of teachers' professional development and self-efficacy. Tran (2014) supported other studies in the literature and found that teachers' participation in professional development programs increased their self-efficacy. It can be concluded that effective professional development will increase student achievement by diversifying teachers' teaching practices in the classroom environment. Within the scope of the research, recommendations are organized and presented below.

- School administrators can provide opportunities for teachers' professional development by encouraging teachers' communication and collaboration with each other and supporting teachers to learn more. This can increase teachers' self-efficacy and improve their achievement.
- Policy practitioners can allow teachers to have more autonomy in choosing textbooks and teaching formats.
- Create a system of professional counseling to support student and teacher psychology in schools to solve problems.
- Teachers' opinions and suggestions should be taken into account in professional development activities not only as participants but also as decision makers.
- In future studies, different variables in the TALIS questionnaire can be used with different analysis methods.

There are some limitations within the scope of the research. First of all, the research is limited to the teachers who participated in TALIS 2018. It is also limited to the questions used in the questionnaire in TALIS 2018. On the other hand, the answers given by the teachers were evaluated only at one time point. In addition, the interaction between teachers' self-efficacy and professional development also limits the correlation between variables.

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Exploring the Adoption of Zoom Cloud Meeting under the Perception of Diffusion of Innovation theory

Prof. Dr. Aytekin Isman
Cyprus International University, Faculty of Communication,
Sakarya University, Faculty of Communication
isman@sakatya.edu.tr, aisman@ciu.edu.tr

Rehan M. Yahya
Cyprus International University, Faculty of Communication
raihan22.alsayyed@gmail.com

Abstract
This study used the diffusion of innovation theory to explore the spread of the Zoom cloud meeting platform among Palestinian users in order to determine its extent among those who use it at work, whether they are students, academic professors, trainees in online courses, or employees, to comprehend the factors that contributed to the acceptance and adoption of this platform, and to discover how the Palestinian users benefit from this Platform, and to identify the factors that could result in a poor diffusion and adoption of this new technology.

This qualitative study utilized semi – structured interviews to accomplish the goals of the research and answer its questions. These interviews were based on a pre-established set of questions which were asked to all respondents. Semi- structured interviews were chosen as a tool for study because it's a flexible tool and gives the opportunity to ask follow-up questions (Brenne, 2017) in order to delve more deeply into topics addressed. Ten interviews were done with diverse Palestinian Zoom platform users to discover the characteristics and determinants that motivate them to use and adopt it in order to have a clear idea about the factors that helped in Zoom platform diffusion in the Palestinian society. The interviews also aimed to reveal the reasons that might affect the platform rejection.

The study found that COVID 19 pandemic and the subsequent employment of distance education primarily contributed to the diffuse of Zoom among university professors and students. The fact that Zoom is free, easy to use, and does not require prior technical ability to run and use are the most significant factors that influenced users to adopt it. Zoom is used by Palestinians to hold lectures and attend meetings. In situations where face-to-face communication is challenging, they also use it.
Keywords: Diffusion, Zoom, Palestine.

Introduction
At present, the areas of technology and communication have overlapped considerably. Information and Communication Technology field refers to the use of computerized communication technology as a network for searching and retrieving information, it includes hardware and software that could be used to transfer information resources (Johari et al., 2020).

Communication technology has been instrumental not only in developing and facilitating communication among humans, but also in teaching, learning and research (Gray et al., 2020). One of these technologies is video conferencing software that gives the ability to two or more persons in different sites to communicate by using audio and video imaging at the same time (Gough & Rosenfeld, 2006).

Video conferencing term is indeed applied to a wide variety of situations from live video lecturing to large audience, to individual-to-individual desktop PC chats (Coventry, 1995). Colleagues, family members, peers and co- worker have a need to stay connected, mostly when they become separated by distance, thus video conferencing has more and more helped to satisfy this need with the availability of inexpensive webcams and free video conferencing software such as Google Talk, Skype and Adobe connect (Judge & Neustaedter, 2010).

Coronavirus pandemic made video conferencing technology an essential tool for business, consumers and even families and friends, as this technology contributes in businesses survive, gives the ability to schools and universities to keep teaching, as well as give the possibility to families and friends to stay connected (Sevilla, 2020).

Following the emergence of the coronavirus pandemic, the Palestinian government declared a state of emergency in the country and has closed universities, colleges and schools across the country since 14 of March 2020, and for higher education, the ministry demanded all universities to conduct online classes to serve the student (Jawabreh, 2020).

During the critical period of lockdown, Palestinian universities began to employ Zoom cloud meeting platform to hold lectures and communicate with students.

Coronavirus pandemic has contributed to the widespread use of certain platforms for education, meeting and remote communication for various purposes in the Palestinian territories, mainly, Zoom cloud meeting platform. So, this study comes to explore the diffusion of Zoom and its extant among Palestinians who use it in their daily life and to understand the factors that might facilitate the acceptance of it and determine the factors that might degrease Zoom adoption.

Diffusion of innovation aspects
There is no doubt that the diffusion of innovation is one of the key mechanisms of technical and social change. In decades, many general aspects of diffusion have been developed (Katz & Hamilton, 1963).

Many scientific fields have been concerned with the concept of diffusion in societies, including education and public health, and this was shown in their research interest of "the rate of acceptance of innovation in school system" and things like "the spread of the kindergarten or sup- plementary reading" and the acceptance of new health practice, in addition of Marketing field with its interest in the "spread of acceptance" of new products and the interest in the extent to which kids games have spread from region to region (Mort & Cornell, 1941; Cosbey, 1985).

Historically, interest in the concepts of diffusion in communication began after the rapid spread of radio in the late 1920s and early 1930s. Subsequently, many media studies examining the campaigns and effects of mass media have tried to discover the relationship between the diffusion of innovations in societies and social processes (Katz, 1957).

The concept of "Diffusion" is expressed in communication research from a sociological perspective and it is commonly referred to several expressions, including the expression of "Acceptance", which refers to "the time of acceptance" in order to determine which people have and have not accepted an innovation or what percentage of population members in different communities have accepted (Katz & Hamilton, 1963). Communication studies usually link the timing of the "first use" of innovation with the concept of acceptance, although the first use of innovation does not necessarily mean continuing to use it, therefore communication researchers tried to distinguish between two other concepts related to the diffusion which are the concepts of "trial" and "adoption" (Ryan & Gross, 1943). Which means that the first use does not lead directly to continued use according to communication studies.

Time is the most important element when talking about the concept of diffusion, as the element of time is different in studies researching the concept of diffusion, when studying mass communication campaigns, immediate results are usually indicated, but studies on the diffusion of a particular innovation usually point out to the need to a long time (Cosbey, 1985).

Time is a vital component in the diffusion process because it gives the chance to identify the characteristics of early adopters and to build the flow direction of the influence and provides a ground for the diffusion curves charting, in this way it provides the possibility to develop a mathematical design of variations in the diffusion process Young, 2006).

The concept of diffusion in communication is linked to other important concept, which is the "adoption". There are items require collective adoptions but allow any individual to adopt or not, such as the telephone. However, there are other items where the group adopts as a single unit leaving no chance for individual option (Katz & Hamilton, 1963).

Culturally acceptable in a given society undoubtedly plays a significant role in determining the form of adoption as individual or collective adoption. There are also innovations that require collective adoption, which means that it can only be adopted collectively, versus other innovations that can be accepted and spread after being adopted individually (Katz, 1962).

It is not possible to talk about the diffusion of a particular innovation without indicating which channels contributed to the spread of this innovation in one or several societies. However, communication studies have not sufficiently explored mechanisms and channels that have contributed to the spread of innovations (Cosbey, 1985). Some of these studies, were concerned with channels of distribution rather than with channels of communication (Markus & Agres, 1977).

Values, attitudes, and personality represent one of the significant set of variables that have been related to the acceptance and diffusion of innovation. The primary idea is that the "fit" between the culture of a group or the individual personality of and the proposed innovation is very essential to accept and adopt in any diffusion process Valente, 1995). Thus, diffusion refers to the process by which innovations are communicated through certain channels over time among members of a social system (Rice & Katz, 1985). Certain concepts are related to diffusion, such as "acceptance", "time", "adoption" and the values of the "social system.

Zoom Cloud Meeting
Zoom cloud meeting is a web platform for conferencing based on the cloud. It's a technology based on "just- in-time" software (Nuryana et al., 2021). Founded in 2011 by Eric Yuan (Rianto & Apriyanto, 2021). On Zoom, Participants can contact with each other through visual video or voice, and through live chats. Discussions can be saved for later viewing and screens can be swapping (Mahalakshmi, & Radha, 2020). Users can download Zoom Cloud Meetings application directly via Google Play store on the smartphones during the pandemic of COVID-19, schools and colleges arranged class meetings and home assignments with online meetings on Zoom and other web- based platforms (Gunawan et al., 2020). Zoom cloud meeting contributed in providing online learning similar to regular classes without space and time and users were given the chance to interact as in a regular class. Zoom is a user-friendly as it easy to use, making it easier for users to adapt (Sevilla, 2020). On the other hand, Zoom cloud meeting has some weaknesses in the different versions of the premium and non-premium. Users of Non-premium only get a chance of 40 minutes per session, then they have to leave and re-enter the room again, and a limit of 100 users each meeting (Nuryana et al., 2021). While the spread of the Corona virus has posed a challenge to advanced countries, this pandemic has posed a greater and more complex challenge to the Palestinians who continue to live in a highly unstable political environment that has lots of restrictions on people mobility, and access to sufficient infrastructure and educational resources (Hamamra et al., 2021). However, one positive impact of the outbreak during the pandemic was illustrated in the adoption of digital education by many Palestinian academic institutions (Abumaria, 2020; Jawabreh, 2020). Several web platforms were employed for this purpose such as Zoom cloud meeting, which was adopted wildly in Palestine, mainly for educational purposes.

Goals and Objectives
There are three goals in this research. The first goal is to educate people about the terms of Diffusion of Innovation theory and its implementation in media and communication field, and effectively using this theory on one of the cloud conferencing programs that has been used extensively, immediately after of the Coronavirus pandemic, and the emergence need of people to use specific remote communication programs and apps, such as Zoom Cloud Meeting, in order to continue their lives normally. These programs and applications were used for personal communication, communication for educational and training purposes and meetings holding. This theory was established by Everett Rogers, who is one of the world's top innovation researchers (Mahony & Wozniak, 2005) and its theory of diffusion is a well-known setting for technological innovation (Mann, 2006). Therefore, diffusion of innovation theorized by Rogers presents a conceptual framework would help to explain what contributes in shaping users decision to involve in or resist to Zoom Cloud Meeting and provide insights about the reasons why individuals do or do not involve in adapting cloud conferencing programs in general.

The second goal of this study is to make people aware about the benefits and advantages of Zoom Cloud Meeting as one of cloud conferencing programs that facilitates the remote communication and helps in facing any Temporary or permanent obstacles to face-to-face communication and exploring more about the efficiency of using and adopting it for various purposes. The use of Zoom application and program is now very commonly used particularly after COVID-19 pandemic due to the various features that it has which helped in adopting it as a medium for remote communication by combining video conferencing, chat, online meetings and mobile collaboration (Mahabbah, 2021). Zoom Cloud Meeting program and application offers more advantages compared to other similar applications because users, particularly in education, training and meetings holding have the ability to communicate verbally and face-to-face by camera (Marsiding, 2020). Some recent studies on Zoom Cloud Meetings have shown a positive correlation between using Zoom program and application for educational purposes and increasing the positive motivation towards study (Laili & Nashir, 2020) also, the use of video conferencing like Zoom Program in distance learning greatly assist users in learning, training and holding meeting because educators can interact even in different places (Mahabbah, 2021). Zoom application can be downloaded for free, its features include mobile calls, presentations, webinars and many others (Gray et al., 2021).

The third goal of this study is to make people aware about the weaknesses of Zoom Cloud Meeting program and application that may decrease Zoom adaption, and educate them about any developments that Zoom Company applied in order to develop the program and application work. These weaknesses could be related to speed in internet or network accessing, costs for internet access, bandwidth limitations, and background knowledge about using internet (Cumberlands, 2021). As is well known, Zoom program users of Non-premium only get a chance

of 40 minutes per session, then they have to leave and re-enter the room again with a limit of 100 users each meeting (Nuryana et al., 2021). The online using of Zoom Cloud Meeting is still influenced by a number of factors adversely affecting its effectiveness including that some teachers, learners, trainees and parents do not understand the nature and features of Zoom Cloud Meeting properly (Marsiding, 2020). In addition, Zoom cloud meeting has faced multiple security weak points and privacy concerns in the past. Also, while Zoom Cloud Meeting offers a free basic plan, its advanced plans and features can be quite expensive for individual users and small businesses (Hodge, 2022).

The importance of the study
There are three importance in this paper. First, this study seeks to understand the process of adopting technology in Palestine through studying the process of adoption Zoom Cloud Meeting program and identifying the factors affecting the process of accept this modern technology. The clear determinants of the adoption of new technologies are the advantages to the user and the costs of adoption. The importance of this study is therefore to explore the determinants and characteristics that drive Palestinian users to adopt the use of the Zoom program. It's obvious that the adoption of new technology by many people contributes greatly to human well-being as it is important to emphasize that the diffusion and spread of technology and invention contributes to economic growth and changes the productivity rate, not the invention itself (Hall &Khan, 2003). Hence, this study utilizes the diffusion of innovation theory to explore the spread of Zoom cloud meeting program process among the various segments of Palestinian users in an effort to understand the benefits that users received and led them to adopt it in their daily lives, especially that Zoom as an example of online conference apps can contribute to overcoming obstacles of inability to communicate in some cases, such as challenges faced by people with physical or health disabilities. Zoom enables these people to participate in remote meetings and interact effectively with others. Zoom works to provide multicultural environment, which helps to communicate between different cultures and promote understanding (Laili & Nashir, 2020) and this is an important benefit of adopting modern technology.

Second, the importance of this study also comes from its trying to determine the role of social and daily life factors in the process of adopting Zoom cloud meeting program as a modern technology. One of the most important factors that encouraged people to use Zoom program and application was the spread of the coronavirus pandemic and the emergence of their need for distance education (Nuryana et al., 2021), especially that people in Palestine are used to using telecommunication programs such as Messenger, WhatsApp, Skype, etc. In addition to the availability of many information materials on YouTube in Arabic language that give guidance on how to use this program for those without any previous experience in this field. Palestinian people also face sometimes difficulties in accessing their workplaces, universities and schools when there are Israeli intrusions into Palestinian cities and villages. This has contributed to their increased use of zoom and other similar programs in an effort to continue their life normally.

Third, this study is important for identifying the obstacles of using Zoom Cloud Meeting in Palestine, as well as identifying ways in which it can be used better. Some users can have difficulty downloading and installing the app on their devices, and may experience technical compatibility issues with some operating systems or devices. Additionally, poor Internet connectivity may affect sound and image quality and lead to audio jamming and delays in communication, affecting the quality of the user's experience. Some users can consider apps that require access to the camera and microphone, such as Zoom cloud meeting as a risk to their privacy and personal security, and this can reduce the spread of the program. In addition to not recognizing usage; some users may find it difficult to understand how to use the app and identify appropriate options, and this may reduce their desire to use Zoom cloud meeting. High cost can be an obstacle to widespread use of some types of modern technology such as Zoom Cloud Meeting. Users need a computer, a smartphone and a powerful internet connection to use Zoom, and getting these technologies can sometimes be expensive, especially in remote or poor areas .In addition, high cost can be a barrier for small businesses that may be unable to pay for a Zoom subscription.

The Problem of the study
Zoom Cloud Meeting program and application is one of the most prominent modern technologies adopted in the present era around the world and is an essential tool for telecommunication and distance learning, where individuals and institutions can use it to organize virtual meetings, presentations, workshops and online lessons (Johari et al., 2020 ;Zhang, & Li, 2020). On the other hand, one of the important theories in communication science that aimed to explain how modern technologies are spread in society and their applications at different levels is the theory of diffusion of innovation that established by Rogers in 1962. This theory is central to understanding the process of the spread of new technologies and how they are accepted by the public (Rogers, 2003).

Based on the above, this qualitative study tries to explore the adoption nature of Zoom Cloud Meeting in the Palestinian society under the Perception of Diffusion of Innovation theory by discovering the key characteristics

of Zoom Cloud Meeting that make it appealing to potential adopters in the Palestinian society, and highlighting the benefits that Palestinian users receive as a result of using zoom cloud meeting in their daily life, and understanding how the perceived relative advantage of Zoom Cloud Meeting compared to other video conferencing platforms influence its adoption among different segments of the Palestinian society, and finally, highlighting the weaknesses of Zoom cloud meeting that prevent Palestinian people from adopting this platform.

The Theory of the study
This research relies on the Diffusion of Innovation theory, which was developed in 1962 by the American sociologist and communication theorist Everett Roger (Dearing & Cox, 2018). The diffusion of innovation theory explains how innovations propagate methodically through diverse social systems and how individual characteristics cause people to embrace innovations at different periods and from varied informational volumes and sources (Ma et al., 2014).

Rogers's theory provides a framework for comprehending and anticipating the factors that can hasten or hinder the diffusion of innovations (Mustaffa, 2011) and serves in interpreting how trends expand. Also, it serves in determining if a new introduction will succeed or fail (Dearing & Cox, 2018).

The diffusion process is described by Rogers' theory as "how an innovation is communicated through specific channels for a period of time throughout the members of a social system" (Rogers, 1983, p. 5). The innovation itself, which is the central part of the diffusion process since it serves as the subject of communication and the primary consideration for potential adopters (Hornor & Emerson, 1998), is the first element of Rogers' theory four essential component.

An "innovative" notion, product, or practice is one that the members of a social system see as novel or unusual. The introduction of a new product, technique, or procedure could constitute an innovation (Davies, 1979). The second component of the theory is communication channels, which refers to the ways in which the invention's source informs potential users of its existence (Dearing & Cox, 2018). According to Isman and Dagdeviren (2018), these channels might be either interpersonal, such as friends, family, or opinion leaders or mainstream, such as radio, television, or newspapers. The third essential element of the diffusion of inventions is time. The spread of innovation can be tracked throughout time on different scales, including micro scales like an individual adopting an innovation, and macro scales like a society's economic growth or technological advancements (Hornor & Emerson, 1998; Gomulko, 1971). According to the theory, an S-shaped curve can be used to depict the adoption process or rate of diffusion. This curve demonstrates how, when innovation gets adopted more broadly, the rate of adoption initially starts slowly, then swiftly climbs, and then eventually slows down (Rogers, 1983). The social system is the process of diffusion's fourth element. The diffusion process, in accordance with the theory, consequently occurs inside a social structure, which can be a collection of people, a business, or a society. Participants in the social system connect with one another through various forms of communication and disseminate information about the invention (Kaminski, 2011). Rogers (1983) classified adopters into five categories based on the relative timing of their adoption of an innovation. Innovators, those who accept new concepts initially. The theory makes the supposition that they are audacious, risk-takers, and willing to try forth new ideas. They are often wealthier, more educated, and younger than the normal adopter (Davies, 1979). Early adopters are the second group to adopt a new concept. They are regarded as thought leaders by their peers, respected by them, and regularly consulted for assistance (Miller, 2015). The early majority is considered to be the third group of individuals to adopt an innovation. According to the theory, people deliberate carefully before making choices and typically adopt innovations only after the early adopters have proven their feasibility. They usually have lower social standing, are older, and have less money than early adopters (Valente, 1996).

The late majority is the fourth demographic to accept a new innovation. According to the theory, they are people averse to change and are more hesitant to adopt a novel concept before it has achieved broad acceptance (Oldenburg & Glanz, 2008). According to the hypothesis, laggards are those who accept innovations last. According to the theory, they are traditional, sensitive to change, and unwilling to adopt advances until they are completely required. Laggard are often older, in a lower social status, and with less financial resources than the early majority and the late majority (Hornor & Emerson, 1998). Rogers (1983) and Greenhalgh et al. (2004) have delved deeply into the characteristics or features of innovations that are most probable to influence the pace and extent of adoption and dissemination. Relative advantage, compatibility, complexity, trialability, and observability are the main criteria for which there is a significant body of evidence (Rogers, 1983; Greenhalgh et al., 2004). The theory contends that innovations are more likely to be adopted if they are consistent with the standards, principles, and assumed needs of the target users and demonstrate the superiority thing, or program they replace (Oldenburg & Glanz, 2008). Additionally, the theory contends that less complicated technologies are more likely to be adopted than more complicated ones (Davies, 1979). According to the hypothesis, innovations are more likely to be

embraced if their benefits can be rapidly understood and observed by others and if those who are their target audience were able to try them out in small doses (Greenhalgh et al., 2004).

The current study has used the theory of the diffusion of innovations to identify the attractive factors and reasons that drive individuals, organizations and institutions in Palestine to make decisions of adopting and accepting Zoom cloud meeting, and to identify the most important characteristics and features of this platform that have led to it spreading and adapting, as well as identifying the most important factors that drive some people not to accept and adopt this program and discover if there are any preferred alternatives that people usually use instead of Zoom cloud meeting platform.

Literature review
There are several studies addressed the subject of Zoom Cloud Meeting platform diffusion, acceptance and adoption. The first one was done by Praymee et al. (2022), which entitled:" Acceptance of Online Learning during the Covid-19 Pandemic: An Innovation Diffusion Perspective".

The objective of this study was to utilize the diffusion of innovation theory to determine the degree to which online instructional management helps learners to adopt it in the context of the COVID-19 pandemic. According to the paper, online instructional management refers to online platforms and technology that are used to supply educational materials and content. It entails the use of a variety of methods and instruments, including online discussions, virtual classrooms, examinations, and lectures. The research team used an online questionnaire as the data collecting instrument to collect data from a sample of 400 undergraduate students. The study used the diffusion of innovation theory as a framework to analyze the data collected by applying the five attributes of innovation to assess the acceptance of online learning. The study also examined the five stages of the innovation to understand the factors that influence the acceptance of online learning. The study discovered that the students' perceptions of the advantages of online learning were moderate. The students also perceived that the complexity level of online learning was at the moderate level. The study discovered that first-year students had a tendency to acknowledge their online learning experiences at a higher degree than students in following year levels.

The current study matches with Praymee et al. (2022) in using diffusion of innovation theory as a framework to evaluate Zoom cloud meeting platform which used usually for educational purposes and to understand the reasons why users adopt it for learning benefits.

The second study was done by Junaedi and Ulfa (2022), which entitled:" Students' Communication Ability in Learning English Assisted by Google Classroom and Zoom Meetings". This study's objective was to evaluate students' communication abilities while they were learning English for Specific Purposes using Google Classroom and Zoom Cloud Meetings.
This study used questionnaires, interviews, and presentations in English to evaluate students' communication skills at the Faculty of Languages and Culture, particularly in the English program at the University Of 17 Agustus, Semarang. With the results of the analysis of the written test data and the interview data being compared to obtain reliable data, the study also sought to derive conclusions from the data obtained and validate these conclusions. To assess the communication abilities of the students, genuine data was employed. Only four of the 16 respondents (students) in the English program at the Faculty of Languages and Culture who took part in online learning for English for Specific Purposes courses supported by Google Classroom and Zoom Cloud Meetings were found to have sufficient mastery of English for Specific Purposes, according to the study results as described in the paper. The survey discovered that the respondents' English-speaking skills were still primitive, which would have a significant impact on their future capacity to communicate in English in the workplace. The study also discovered that in order to communicate the material properly, learning media must be chosen in accordance with the learning demands. The study found that teaching English language skills and, in particular, speaking skills, need to face-to- face meetings, basically supported by online meetings for strengthening purposes.

Junaedi and Ulfa (2022) matched with the current study in using the qualitative methodology and utilizing interviews as a tool to monitor the benefits of zoom platform.

The third study was done by Mahabbah (2021) which entitled: ".An Analysis of Students' Perceptions about The Efficiency of Using of Zoom Cloud Meeting for Online Learning during Pandemic Covid-19. The study's objective was to evaluate the effectiveness of using the Zoom cloud meeting tool for online learning as a substitute in the Covid-19 epidemic era. The University of Islam Malang's fourth, sixth, and eighth semester English students were the subject of the study.

Thirty students from the Islamic University of Malang were interviewed via WhatsApp while receiving questionnaires via Google Form as part of the project's qualitative research approach. A qualitative technique was used to examine and interpret the data. Based on the study's findings, most participants thought the Zoom Cloud Meeting application was practical for online learning. The software was deemed to be the best substitute method for carrying out face-to-face learning activities because it facilitated contact with professors and made learning easier. In addition, the Zoom Cloud Meeting program for online learning was found to have superior video and image quality than other video conferencing tools, which could have been more varied and precise. According to the findings, teachers and students who display PowerPoint to explain material during presentations found it very simple thanks to the video and image quality of the Zoom Cloud Meeting Application for online learning. According to the study, using Zoom Cloud Meeting can be problematic because of poor signals for students without robust Wi-Fi, difficulties in watching practical lessons, and some sound interruptions that interfere with learning activities.

The current study intersects with Mahabbah (2021) in that both studies use the qualitative approach and rely on interviews as a research tool and investigate the factors that contributed to the adoption of the zoom platform by users. Mahabbah (2021) also was used in building the theoretical frame work.

The fourth study was done by Ndlovu and Sibanda (2021). Which was entitled:" Digital Technologies and the Changing Journalism Cultures in Zimbabwe: Examining the Lived Experiences of Journalists Covering the COVID-19 Pandemic". This study's objective was to investigate the experiences of Zimbabwean journalists during the COVID-19 pandemic, focusing on how they adopted and utilized digital technology during their professional efforts, such as zoom cloud meeting and What's up. The study also aimed to investigate how the epidemic has altered typical newsroom procedures and journalists' daily work schedules.

In order to better understand how Zimbabwean journalists covered the COVID-19 pandemic and how they adopted digital technology for their daily professional job, the study used a qualitative methodology. A framework for analyzing the journalists' interpretations of their professional practice was supplied by the qualitative approach. 21 journalists including editors, producers, reporters and online content creators were interviewed. The study found that digital platforms such as Zoom and WhatsApp were appropriated for virtual diary meetings during the COVID-19 pandemic. Journalists used these platforms to conduct weekly staff meetings and daily diary meetings online. According to the study, journalists were able to work remotely and practice their craft from anywhere using digital technologies such as laptops, smartphones, Zoom cloud meeting, What's up and internet connectivity. This means that journalists are no longer confined to physical newsrooms but could work from the comfort of their homes or any other location with internet access. The study also discovered that throughout the pandemic, journalists primarily depended on social media platforms like WhatsApp, Facebook, and Twitter for news sources and dissemination.

The current study like Ndlovu and Sibanda (2021) relied on qualitative method and used interviews as a tool to collect data about the reasons of Zoom cloud using.

The fifth study was done by Nuryana et al. (2021), which entitled:" Factor of Zoom Cloud Meetings: Technology Adoption in the Pandemic of COVID-19. The purpose of this the study was to look into whether or not students in Indonesia's educational system intended to use the Zoom platform during the COVID-19 outbreak and to demonstrate the significance of hedonic motivation and perceived self-efficacy in the notion of The Unified Theory of Acceptance and Use of Technology (UTAUT).

The study used quantitative techniques to evaluate the validity and reliability of items and test hypotheses. The theory has been used is a theoretical model that explains how users adopt and use new technologies. The model proposes that four main factors influence users' behavioral intention to use technology: performance expectancy, effort expectancy, social influence, and facilitating conditions. It also considers the moderating effects of gender, age, experience, and voluntariness of use on the relationship between the four main factors and behavioral intention. The total participants in the questionnaire were 175 people: lecturers, teachers, and students at the university and were randomly drawn. The findings indicated that hedonic desire and perceived self-efficacy were the behavioral intention drivers for using the Zoom platform during the COVID-19 epidemic. Hedonic motivation refers to the intrinsic benefits that individuals derive from using technology, such as happiness, pleasure, and enjoyment. The study also discovered that platform usability significantly influenced users' behavioral intent. The study also found that users of Zoom program have demonstrated how easy it is to use. The study suggested that when determining the appropriate application in times of emergency, it is necessary to consider the user's excitement and comfort, which are related to hedonic motivation.
The current study and Nuryana et al. (2021) focused on new technology adapting and the factors that drives to it.

The sixth one was done by Octaviani (2021), which entitled:" The use of zoom cloud meeting for teaching English grammar in an online class". The purpose of this study was to report how Zoom Cloud Meeting was used for English language instruction in a senior high school in Gresik, Indonesia, as well as any challenges that teachers encountered.

The study used qualitative research techniques, such as depth interviews and observation, to collect information from an English teacher who used Zoom in their lesson. According to the study, the teacher used Zoom to teach English grammar to students by following the procedures of teaching grammar, which included brainstorming with the students, outlining the readings, providing examples that connect to the readings, having the students do the exercises, and providing feedback. The study also found certain challenges the teacher faces while utilizing Zoom to teach English, including technological difficulties, unmotivated students, and little engagement. By employing a variety of tactics, including clear directions, interactive exercises, and encouraging comments, the teacher was able to overcome these challenges. According to the study's findings, Zoom can be a useful tool for teaching English grammar, but instructors must be aware of any potential drawbacks and employ efficient techniques to get over them. The study discovered that Zoom had certain special capabilities that were particularly useful for teaching grammar online, including a camera, speaker, share screen, raise-hand, chat box, and recording. According to the study, Zoom can be a useful platform for teaching English grammar, particularly for challenging subjects that call for clear explanations.

The current study matched with Octaviani (2021) in the fact that the two studies used qualitative methodology and interviews to answer the study's questions and in their endeavor to identify the strengths of the Zoom platform that encourage its adoption.

The seventh study was done by Gray et al. (2020), which entitled:" Expanding Qualitative Research Interviewing Strategies: Zoom Video Communications".

This research examined using Zoom video conferencing to generate data for qualitative research, highlighted its benefits and potential drawbacks, and offered suggestions for users of the platform. The study also discussed the technical and practical aspects of using Zoom. The authors also examined the potential of video conferencing tools to broaden the accessibility and reach of qualitative research and related their experiences using Zoom for interviews with caregivers of children with complicated medical needs. The approach taken in this study was qualitative research, more precisely qualitative interviewing with Zoom video conferencing as the data collection tool. Each interviewee mentioned how much they liked Zoom's video conferencing features and how open they were to take part in more Zoom interviews. They said they enjoyed having the choice to conduct the interview on their computer, tablet, or phone and appreciated how simple it was to log in and not have to worry about Zoom's technical or functional aspects. In order to avoid weariness and undue interference with their personal routines, participants recommended that the researcher get the interview questions in advance of the interview and that the interview be kept to one hour. The study also provided recommendations for testing Zoom ahead of the interview and providing technical information to participants. The research came to the conclusion that video conferencing tools like Zoom can assist researchers in reducing research costs and gaining access to bigger and more diverse participant populations, potentially resulting in more studies and advancements in the qualitative research field.

The current study and the study of Gray et al. (2020) are qualitative, and the both of them used interviews as a tool to collect data from participants to determine the factors encourage users to adopt Zoom platform and use it for various purposes.

The eighth study was done by Laili & Nashir (2020), which entitled:" The use of Zoom meeting for distance learning in teaching English to nursing students during Covid-19 pandemic". The purpose of this study was to describe the circumstances that emerge throughout the distant learning process utilizing Zoom as an alternate means of resolving issues with teaching English, as well as to determine the efficacy of using Zoom cloud meetings to instruct nursing students in English during the COVID-19 pandemic. The study aimed to provide a guide for other lecturers, teachers, or educators for their online teaching.

The method used in this study was qualitative descriptive method. The researchers gathered information by sending out a survey via Google Form and conducting interviews via video call on WhatsApp. A total of 93 bachelor's in nursing students served as the study's respondents. In order to learn more about the questions posed in the questionnaire, the researchers also interviewed respondents. The study found that the majority of the students (89%) used Zoom platform for first time in learning during the pandemic. The use of Zoom meetings was efficient in terms of time and place where learning is not constrained by space and time; it can be done whenever and wherever there was adequate internet access, according to an interview with nursing students. The study also

discovered that using Zoom cloud meetings to teach nursing students English during the COVID-19 epidemic was successful and innovative in light of the most recent improvement. The study also discovered that using Zoom's features, like screen sharing, meeting scheduling, raising the hand, and conversation, was particularly beneficial for learning.

The current study and Laili & Nashir (2020) used interviews as a tool to collect data from participants. The current study used Laili & Nashir (2020) in building the theoretical frame, particularly, in introducing zoom cloud meeting advantages.

The ninth study was done by Sevilla (2020), which entitled: "Zoom vs. Microsoft Teams vs. Google Meet: Which top videoconferencing app is best. In this article, three widely used video conferencing apps, Zoom Meetings, Microsoft Teams, and Google Meet have been compared and evaluated in terms of their usability, functionality, productivity, and security.

The article discussed the positives and negatives of each app, offered opinions, and ultimately named Google Meet as the overall winner. The purpose of the article also was to aid consumers and organizations in selecting the best video conferencing program. The three apps have been assessed by the author using a comparative analysis method. The video conferencing competition between Zoom Meetings, Microsoft Teams, and Google Meet was said to have been won by Google Meet. The article found that while Google Meet have the characteristics of usability, productivity, and security capabilities, both Zoom Meetings and Microsoft Teams have their advantages. According to the author, Google Meet is just as simple to use as Zoom Meetings, but it also includes the efficiency and security of the Google meet at lesser cost. The author offered a mixed evaluation of Zoom Meetings. On the one hand, Zoom Meetings get praise from the author for being user-friendly. According to the author, Zoom Meetings offered users a wealth of video experience customization options as well as reliable tools for collaboration. On the other hand, the author noted that there are advantages and disadvantages to the sudden adoption of Zoom Meetings for business and family video conversations, education and distance learning, and even broadcasting and media. The author pointed out that although the corporation has swiftly addressed privacy and security concerns, the product's unexpected popularity has exposed flaws.

This study has benefited from Sevilla, (2020) in building the theoretical frame work and preparing the interviews.

The last study was done by Adenegan and Abiodun (2018), which entitled:" Usage of Zoom Cloud Meeting for Virtual Meetings and E-Learning". This study's objectives were to introduce Zoom Cloud Meeting technology as an advanced electronic tool for facilitating online meetings and distance learning and to describe its selection, use, and features using the ACTIONS framework. The study also gave users and potential users specific suggestions for using the platform.

The study utilized ACTIONS model as a framework which is a model for technology selection and application in open learning and distance education. It consists several questions regarding the access, costs, teaching and learning, interactivity and user-friendliness, organizational issues, novelty, and speed of the software. According to the study, in comparison to other online and mobile apps that improve virtual meetings, such as Google Hangout, Skype, Google Meet, and GoToMeeting, etc. Zoom cloud meeting technology is deemed advanced and well-suited for distance education. Based on its features and capabilities, Zoom platform was found to be easy-to-use, provided a rich video conferencing experience, and enabled collaboration from any device and all types of connections. Additionally, its unique features such as virtual background, and simultaneous screen share were highlighted as advantageous for virtual meetings and e-learning. File sharing, HD video and voice, active speaker view, full-screen and gallery view, desktop and application sharing, personal room or meeting ID, instant or scheduled meetings, Chrome and Outlook plugins, MP4 recording, private and group chat, host controls, are among its features that facilitate the education process according to the study.

The current study has benefited from Abiodun (2018) in building the theoretical framework as it provided an expanded descriptions of zoom cloud meeting platform and helped in preparing the interview questions.

Methodology
The questions of the study
This qualitative study was designed to explore the Palestinian user's adoption of Zoom Cloud Meeting under the Perception of diffusion of innovation theory. Several questions are raised to achieve the purpose of the study. These questions are:
1. How did Palestinian users get to know Zoom for the first time? And when did they start using it?
2. Do the Palestinian users use Zoom cloud meeting platform in regular basis?

3. What are the characteristics of Zoom Cloud Meeting that make it appealing to Palestinian adopters?
4. What are the benefits that Palestinian users receive as a result of using Zoom cloud meeting in their daily life?
5. What are the weaknesses of Zoom cloud meeting that might prevent Palestinian users from adopting the platform?
6. Are there any other platforms that Palestinian users prefer to use instead of Zoom cloud meeting?

Identification of the population:
300 million people worldwide were using Zoom Video Communications per day as of April 2020. (Vailshery, 2022).

The sample of the study
The sample of this study includes 10 Zoom cloud Palestinian users who use the platform for different purposes, such as, education, teaching and attending meetings. These 10 users were selected using the purposeful sampling technique as the study aims to explore the adoption nature of Zoom cloud meeting platform among individuals who usually use it.

Purposive sampling is a non-probability way of gathering a sample in which researchers utilize their knowledge to select particular individuals who will aid the study in achieving its objectives and it's usually employed in qualitative research (Frost, 2023). Purposive sampling's flexibility enables researchers to acquire data more quickly and cheaply. It provides a method that can adjust as conditions change, allowing for the satisfaction of many requirements and interests (Regoli, 2019).

Data Collection
This qualitative study has used semi- structured interviews as a tool to collect data from the sample that has been chosen purposefully. According to Brennen (2017), the interview is a focused, purposeful conversation between two or more persons and semi structured interview, combines the ability for the interviewer to further examine certain themes or responses with a predetermined set of open questions.

The study's interviews based on a pre-established set of questions that were asked to all respondents. The interview form included 7 opened questions reflecting study questions. Interview questions wondered how users first learned about Zoom's platform, and if the use is regular or intermittent, the reasons drive to use, features available in Zoom platform that encourage the adoption, the usefulness of using the platform from the users' point of view, especially in the Palestinian context, platform weaknesses from users' perspective and wondering about other platforms that could be a substitute for the Zoom platform. The answers of the interviewees have been analyzed based on certain codes have previously being set.

Coding scheme
This study included several codes, the way to learn about zoom platform for the first time, the regularity of using, reason of using, the platform characteristics, platform usefulness, the platform weak points and alternatives of the Zoom platform. These codes are actually qualitative considerations that have been made to facilitate the work and reflect the study's questions. The study theoretical perspectives inform the type of coding analysis that has been used, as well as the types of questions that have been asked (Brennen, 2021).Therefore, this study utilized diffusion of innovation theory key words in informing the questions of the study in addition to its codes.

Table (1): coding scheme

The code	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
The way to learn about zoom platform for the first time.										
The regularity of using										
Reason of using										
The platform characteristics										
Platform usefulness										
Platform weak points										
Other alternatives of the platform										

Data analysis
There is no one method for conducting a qualitative analysis, each theoretical viewpoint implies a set of practices or organizational methods as Gubrium and Holstein (2002a) noted. Data analysis, according to Hair et al. (2006),

is a technique for methodically organizing the data and synthesizing the research results. The steps in the data analysis process are interconnected and turn the raw data into useful knowledge.

This qualitative study used certain codes that were a reflection to study's questions. Each code expresses a particular study's question. The first code which is "the way to get know about zoom platform" is a reflection to the first question of the study that asks about the way the Palestinian users got to know Zoom for the first time and the time they started using it in order to determine the adopters type. The second code is "the regularity of using the platform" which is a reflection to the second study's question about the regularity of using Zoom platform. The wondering about the regularity of using, is essential to monitor the adoption confirmation. The third code is "the platform characteristics" which is a reflection to the fourth question that wondered about the characteristics of Zoom Cloud Meeting that make it appealing to Palestinian adopters since the innovation characteristics have an essential role in the decision of adoption according to the Rogers theory. The fourth code is the "Platform usefulness" which is a reflection to the fifth question that wondered about the benefits that Palestinian users receive as a result of using Zoom cloud meeting in their daily life. The fifth code is "Platform weak points" which is a reflection to the sixth question that wondered about the weaknesses of Zoom cloud meeting that might prevent Palestinian users from adopting the platform. The last code is" Other alternatives of the platform" which is a reflection to the last question that wondered if there are any other platforms that Palestinian users prefer to use instead of Zoom cloud meeting in order to discover any relative advantage of Zoom platform.

Definition of terms:
This study includes the following terms: diffusion, innovation, adoption, social media, Zoom and Palestine. Diffusion: refers to the process by which innovations are communicated through certain channels over time among members of a social system (Rice & Katz, 1985). In this study, diffusion refers to the process by which Zoom cloud meeting platform has diffused among Palestinian users.

Innovation: refers to new ideas, products, services, or behavior (Johnson & Muscato, 2022). In this study, the innovation refers to Zoom Cloud Meeting platform.

Adopting something: it involves doing something different from what one did before, such as using a new product, learning a new behavior, etc. The essential to adoption is that the person must regard the concept, pattern of conduct, or item as novel or inventive (Goss, 1979).

Social media: includes Facebook, Twitter, YouTube, and Tiktok as an examples, is a type of digital technology that makes it easier to share text and video content among online communities and networks (Dollarhide, 2022).

Zoom: a web platform for conferencing based on the cloud. It's a technology based on "just- in- time" software. This technology was founded in 2011 by Eric Yuan (Rianto & Apriyanto, 2021; Nuryana et al., 2021).

Palestine: called Filastin (Biger, 1981). A nation in southwest Asia that is situated on the Mediterranean Sea's eastern shore. Its central position for the world has allowed it to be a link between the Old World continents of Asia, Africa and Europe (Ehrlich, 2001). On the political front, Palestine is one of the world's most security-strained regions as a result of Israeli occupation violations of Palestinian civilian rights, settlement operations that further aggravate the situation not to mention continuing to blockade Gaza and stifle its population for more than 15 years (Marton, 2011).

Limitations of the study
This study sought to explore the adoption of Zoom Cloud Meeting under the perception of diffusion of innovation theory and has four main limitations:
1. The study was limited to Palestinian individuals who often use the Zoom platform for different purposes, such as education, teaching and attending workshops, and so on.
2. Semi- structured interviews were conducted during May 2023 with 10 Palestinians who use Zoom and adopt it for various goals.
3. This study was conducted during the spring semester of the school year 2022-2023.
4. The results of this study represent one case and is confined within the limits of Palestinian society. Consequently, its results cannot be generalized.

Data analyzing and findings
This section includes answering the study's questions by analyzing the data of in depth-interviews that were conducted with 10 Palestinian users of Zoom Platform.

Q_1: How did Palestinian users get to know Zoom for the first time? And when did they start using it?

Code 1	The way to get Know about zoom for the first time
Participant 1	"Since 2020 , due to Corona, I took a data journalism diploma through it"
Participant 2	"Since 2020 due to Corona pandemic"
Participant 3	"Since 2020 through the electronic study due to Corona pandemic"
Participant 4	" I got to Know Zoom during Corona crisis"
Participant 5	" I got to Know Zoom with the beginning of Coronas pandemic"
Participant 6	"I got to know Zoom since corona pandemic and starting the distance education, so I had to use it since it was my university's choice to communicate with the students "
Participant 7	"The first use of the Zoom platform was with the lockdown that kept pace with the spread of coronavirus"
Participant 8	" since 2020, after Corona lock down to attend my university classes"
Participant 9	"I got to know Zoom during the coronavirus period, I was a university student and the study system was converted from facial to the electronic"
Participant 10	" As the coronavirus pandemic started, my university started using the platform to communicate with students"

Result:

As table (1) shows, All interviewees stated that they first learned about the Zoom platform following the start of the Corona pandemic, which led to lockdown and quarantine, necessitating the usage of remote communication.

Q_2: Do the Palestinian users use Zoom cloud meeting platform in regular basis?

Table (2): The regularity of using

Code 2	The regularity of using
Participant 1	I don't use it regularly, but when I attend a particular workshop or course, the organizer is an institution from outside Palestine and relies on zoom to communicate"
Participant 2	"I don't use Zoom Platform in regular basis, but I prefer to use it when I need to attend a meeting or workshop"
Participant 3	"I am no longer use Zoom Platform in regular basis, because I finished my collage study"
Participant 4	" I don't use the platform on a regular basis anymore because of the return to facial education"
Participant 5	"I no longer use the platform regularly except in cases where it is difficult to meet in person with students"
Participant 6	" I use the platform on a regular basis only to meet with geographically distant institutions as my work task require that"
Participant 7	" I no longer use the platform regularly except for specific circumstances in which it is difficult to meet in person with students"
Participant 8	" I use the platform on a regular basis only to attend meetings and workshops with people outside Palestine"
Participant 9	" After my undergraduate studies, I no longer use the platform regularly, now I use it according to the type of work and the need for it"
Participant 10	"I use the Zoom platform regularly because of the increasing orientation of remote work"

Result:

Table (2) reveals that after the coronavirus pandemic and subsequent quarantine ended, the majority of the interviewees no longer utilize the Zoom platform frequently. Instead, they now only use it when necessary to attend meetings with persons who are geographically far from them, or in situations where face-to-face communication is challenging. However, the university lecturer, Participant 10, explained that he uses Zoom platform on a regular basis even after the coronavirus pandemic ends due to" the new orientation of utilizing the remote work" according to his description, and he added:

> "In various contexts, including work, education, and scientific research, I am able to give an efficient and trustworthy method of communication and collaboration thanks to the Zoom platform".

Using Zoom platform in regular basis	3 interviewees
Not using Zoom platform in regular basis	7 interviewees
Sum	10 interviewees

Q_3: What are the characteristics of Zoom Cloud Meeting that make it appealing to Palestinian adopters?

Table (3): characteristics of Zoom platform

Code 2	Zoom platform characteristics
Participant 1	"The platform's software and buttons are easy and we can learn about them easily, we can provide the link to anyone we want to communicate with easily, but we need to continue deal with it, until accustomed to its characteristics"
Participant 2	"The speed of learning to use it and teach it, save time, money and effort, meet emergency needs in easy way"
Participant 3	" everyone can use and deal with it easily in addition to the quality of sound and image "
Participant 4	"Audio and photo quality as Zoom users can record and share meetings with others later and easy to use"
Participant 5	"Free, easy to use, saving time and high quality image and audio with the ability of sharing the screen"
Participant 6	"Free, provides several useful services such as whiteboard, Recording the meetings, the possibility of sharing the screen and controlling the student's device with clear sound"
Participant 7	"For me, the University is participating in the platform as an institution so, there are no problems in terms of the lecture and meeting duration as well as the availability of share screen and cloud storage for lectures".
Participant 8	"free, easy to use and easy to interact with other participant through chat"
Participant 9	"In general, the free features are enough to do most of the work I needed. and the non-free features price is acceptable compared to service"
Participant 10	"What encourages me to use the platform is the ease of use, the quality of sound and image, the possibility of recording meetings and the function of hand lifting, which allows the process of organizing discussions"

Result:

Table (3) shows that the interviewees agreed on a variety of characteristics that they like about Zoom Platform and motivate them to use it. The platform's ease of use and ease of learning to use it, together with the fact that many of its features are free, are its most notable qualities and aid in fully completing the duties.

Participant 2, a secretary used to use Zoom platform since 2020, said that: "zoom provides the possibility of holding meetings for more than 4 hours and allow me to control sound and image if I want to turn off the camera and sound". Participant 6, a lecturer in multi-media, who often teaches practical courses, added that" There are instances when an error or mistakes in the application process emerge, in this cases, I can assist the student remotely. Additionally, having the ability to talk and share files made teaching simpler". She described herself while using Zoom platform for teaching as the "King of the session" because of her complete control in allowing students to open microphones or not and participate in discussions periodically by using the "hand lifting" feature available in Zoom.

4 interviewees expressed their impressing in Zoom audio and video quality. Participant 7, a university lecturer who used Zoom during Corona quarantine to teach, expressed that "the quality of sound on Zoom is often excellent" even with using a laptop microphone only. He revealed that he had "some difficulties in being able to use it at first, but most of these difficulties disappeared over time".

4 interviewees expressed their impressing in recording meetings feature, as Participant 9, a computer engineer, found the Zoom platform to be very helpful for her, especially because it offers cloud storage capabilities, allowing her to attend meetings at a time that is convenient for her. She still uses the Zoom platform to attend meetings and workshops. She added:" potential of Zoom live broadcasting on numerous platforms like YouTube is a really helpful option for people who wish to reach a bigger audience".

Participant 10, a university lecturer talked about the "compatibility of Zoom platform with various devices, including computers, smartphones and tablets" which means, according to his perspective that "Zoom platform provides the element of flexibility to its users". Since Participant 10 is a lecturer, he noted that "Zoom platform gives an easy access to the meetings", thus students usually don't face difficulties in meeting participating.

The most important characteristics of Zoom cloud meeting according to the study interviewees	
Ease of use	8 interviewees
Free	5 interviewees
Audio and photo quality	4 interviewees
Recording the meetings	4 interviewees

compatibility of Zoom platform with various devices, including computers, smartphones and tablets	1 interviewee
Provides several services such as whiteboard, the possibility of sharing the screen, hand lifting, chat and controlling the student's device.	4 interviewees

These results are consistent with Abiodun (2018), Laili & Nashir (2020), Sevilla (2020), Mahabbah (2021), Nuryana et al. (2021) and Octaviani (2021) which found that users of Zoom program have demonstrated how it's easy to use and enabled collaboration from any device and all types of connections and that using Zoom's features, like screen sharing, meeting scheduling, raising the hand, and conversation, was particularly beneficial for learning.

Q_4: What are the benefits that Palestinian users receive as a result of using zoom cloud meeting in their daily life?

Table (4): benefits of using Zoom platform

Code 4	Zoom platform benefits
Participant 1	"I use it usually for attending meetings and workshops. Through the Zoom platform, we were able to complete these meetings even in emergency situations, such as Israel's sudden intrusions"
Participant 2	"Shorten meetings that need to be traveled, enabled me to learn about faculty members who work in other branches and I can't meet them. Simply Zoom platform makes my work easier in certain conditions. In addition, Zoom platform helped not to interrupt work, especially due to Israeli intrusions into Palestinian cities"
Participant 3	"I use it usually for attending meetings and lectures. Zoom platform provided the possibility to meet in times of emergency where we cannot communicate face to face "
Participant 4	"The most important benefit for me is the possibility of recording meetings and therefore the possibility of returning to them at the time that I need, as well as saving my time and money. Holding meetings in critical times, when it's dangerous or not appropriate to meet personally. For example, Corona virus or Israeli intrusions"
Participant 5	"for holding my lectures especially during disruption of universities due to Israeli intrusions into the city"
Participant 6	" Features in the Zoom platform including white board, screen sharing and files made teaching easier. Due to the unstable political climate in the country and the resulting disruption of the educational process, Zoom provided the opportunity to complete educational meetings without interruption. "
Participant 7	"The ability to communicate with the student voice and image at any time through computers or phones. Zoom platform is an excellent alternative in cases where face-to-face study is not possible "
Participant 8	"Efficiently perform meetings and workshops using several devices"
Participant 9	" Doing a lot of meetings electronically using free features facilitate work and save money and time"
Participant 10	"Using Zoom helps me provide an effective and reliable means of communication in a way facilitate my duties"

The result:

Table (4) shows the variety of responses of interviewees about the benefits they obtained from using the Zoom platform, and the most notable of these benefits is the possibility of holding lectures, presentations, workshops or attending them without the need to travel, which helped to save time and money for users. As well as the feature of recording meetings and thus the possibility of returning to them at the time the users want. Participant 7, the university lecturer stated that the ability of using Zoom on laptops and phones facilitated the communication process with his students but he added that:" For me, I only use computer because it allows me to submit presentations and files, and to draw on the screen". For the computer engineer, Participant 9, mentioned that using Zoom platform contributed in saving her safety during Corona pandemic period, as she said:" During the coronavirus period, I was able to continue with education without putting myself in danger".

The university lecturer Participant 10 said that:" Using the Zoom platform helps me provide an effective and reliable means of communication and collaboration in many areas, including work, education and scientific research".

Seven interviewees pointed out that using zoom allows them to complete their work at critical times witnessing Israeli army intrusions of Palestinian cities and consequently disabling all spheres of life usually, through the zoom

platform Palestinian users can hold lectures, meetings, conferences and attend them remotely without jeopardizing themselves.

The journalist Participant 1 stated that:" The use of the Zoom platform for the Palestinian educational institution was the best refuge so that students do not lose many days of attendance as a result of Israeli intrusions and assassinations".

In this context, the engineer and the university lecturer, Participant 4, emphasized that: "Zoom Platform helped provide learning, training and meetings safely and regularly in the days when Palestinians suffered sudden Israel's incursions of Palestinian cities". Participant 5, the university lecturer also agrees with other interviewees in this point. The lecturer university, Participant 7 cleared:" Due to the unstable political climate in the country and the resulting disruption of the educational process, Zoom provided the opportunity to complete educational meetings without interruption".

Participant 7 had a distinct opinion in this context, as he said:" Zoom platform is an excellent alternative in cases where face-to-face study is not possible. And I think Zoom is better than facial education sometimes because it allows the students to listen to the lecture anytime they want".

The benefits of adopting Zoom platform according to the interviewees	
Completing work and holding meetings without interruption or disruption at critical times such as diseases or unstable political conditions	7 interviewees
Attending or holding meetings and workshops	4 interviewees
Zoom platform features facilitate the work	4 interviewees
Save time and money	2 interviewees
The ability to communicate in flexible way by using multiple devices	2 interviewees
meetings recording provides the ability to return to it again	1 interviewees

These results are consistent with Abiodun (2018), Laili & Nashir (2020), Sevilla (2020) and Nuryana et al. (2021) which found that users of Zoom program provides a rich video conferencing experience.

Q_5: What are the weaknesses of Zoom cloud meeting that might prevent Palestinian users from adopting the platform?

Table (5): Code 5 Zoom platform weaknesses

Code 5	Code 5 Zoom platform weaknesses
Participant 1	"The poor Internet in Palestine prevented meetings continuing."
Participant 2	"Sometimes technical issues in audio and image".
Participant 3	" I did not notice any weaknesses"
Participant 4	"If I want to subscribe to Zoom plans that capable of hosting large meetings I should pay".
Participant 5	"Internet connectivity problems. Others may be preoccupied during the meeting, so the effectiveness of the meeting is being undermined"
Participant 6	"I did not notice any weaknesses"
Participant 7	"Sometimes, internet connection problems, but, from my personal observation, I found that the Zoom platform works effectively even at low internet speeds as long as there is no use of video".
Participant 8	" If I want to hold long meetings, I have to pay"
Participant 9	" A single account can be entered by more than one person with more than one device"
Participant 10	I should have a strong internet connection to use the Zoom platform efficiently".

Table (5) shows that four of the interviewees think that Zoom cloud meeting need a high speed internet, with weakness in the Internet in Palestine. This causes "interruptions in long encounters up to three hours" according to the journalist Participant 1 that started using Zoom platform since 2020, or "malfunctions in the clarity of sound and image" according to the secretary Participant 2, who uses the platform to participate in the educational institution meetings she works in. Participant 5, the university lecturer and the computer engineer Participant 10 also noticed that they need a high speed internet connection to use Zoom platform efficiently. Participant 7 the university lecturer has also pointed out to the need of high speed internet to use Zoom, however, he found that:" Zoom platform works effectively even at low internet speeds as long as there is no use of video with being confined on presentations and audio".

While both Participant 4 the lecturer at the faculty of engineering, and the electric engineer Participant 8 pointed to the need to pay for some of the Zoom services, including an increase in the duration of the meeting beyond 1 hour.

The computer engineer, Participant 9, pointed out to another point regarding to the privacy, by saying:" "A single Zoom account can be entered by more than one person with more than one device".

Participant 7 noticed an issue about Zoom records. He said:" another problem is that the platform keeps records for a specified period of time and not forever". However, he emphasized:" the platform sends alerts near final deletion to any file to give me the chance to load onto another memory before deleting it". In the same context, he cleared that he contacted with Zoom platform to restore a deleted file, but they never answered, and then they sent him an email asking for a service review that did not happen at the first place".

Participant 5, pointed out to the distraction that might happen while using online Platforms such as Zoom to learn, by saying:" the students may be preoccupied during the meeting, so the effectiveness of the meeting is being undermined".

Two participants stated that they did not notice any weaknesses during their use of the Zoom platform.

Zoom platform weaknesses	
Zoom platform need for high internet speed to run fully effective	4
The platform is not fully free and some of its useful features need to be prepaid	2
There are no weaknesses	2
technical issues in audio and image	1
Privacy Issues	1

These results are consistent with Mahabbah (2021) and Octaviani (2021) that talked about certain challenges while utilizing Zoom, including technological difficulties such as sound interruptions and poor signals without robust Wi-Fi.

Q_6: Are there any other platforms that Palestinian users prefer to use instead of Zoom cloud meeting?

Table (6): Zoom platform Alternative

Code 6	Zoom platform Alternative
Participant 1	"google meeting. I've been using it for a long time, easy to use, with Zoom characteristics, and I prefer it because it doesn't need high internet speed like Zoom, and I used it in several meetings instead of Zoom."
Participant 2	"I don't need a substitute for it. From my point of view enough because of its positives."
Participant 3	"I don't need a substitute for it"
Participant 4	"for work, I only use Zoom, since I am a member of educational institution that has a subscription in Zoom platform"
Participant 5	"I have no idea about any alternatives, my institution has a subscription in Zoom so I use it"
Participant 6	"I prefer zoom, its options wider, more inclusive and clearer in comparison with Google meets and Microsoft teams"
Participant 7	"Because of the University's subscription to the Zoom platform, I didn't use any other platform and so I can't compare them. I know there are other platforms, but I didn't use them."
Participant 8	" I prefer to use google meets as it's easy, plus it doesn't need a high-power internet"
Participant 9	"There are a lot of similar platforms, but I prefer Zoom to them because Zoom application has become familiar with the majority and it makes it easier for the person to deal with it, as well as its services are sufficient for what I need"
Participant 10	" There are other platforms like BigBlue Button that I have used and what distinguishes them as open source so that the developer can install and customize them to suit its requirements"

Table (6) shows the diversity of the responses of the interviewees about the alternate platforms of the Zoom platform that they might prefer to use . The answers show that four of the persons interviewed are not involved in using platforms other than zoom because of its sufficient characteristics to perform their work and tasks, as the secretary Participant 2 said:" I don't need a substitute for it. From my point of view, Zoom platform is enough because of its positives."

Three of the interviewees, especially university professors, expressed no need for an alternative to the zoom platform since they used it because of their educational institutions subscription in Zoom platform on a paid basis. For example, the university lecturer, Participant 4 said:" for work, I only use Zoom, since I am a member of educational institution that has a subscription in Zoom platform". The university lecturer, Participant 5, also stated that:" "I have no idea about any alternatives, my institution has a subscription in Zoom so I use it".

Meanwhile, both the journalist Participant 1 and the electric engineer Participant 8 cleared that they prefer to use Google meet because it doesn't need a high speed internet connection as Zoom. Fuqha said:" I've been using Google meet for a long time, easy to use, with Zoom characteristics, and I prefer it because it doesn't need high internet speed like Zoom".

The computer engineer and university lecturer Participant 10 cleared that he prefers to use other platforms like BigBlue Button, because it's distinct from the Zoom platform that it's" an open source" , so "the developer can install and customize them to suit requirements" as he described. The university lecture, Participant 6 showed that she prefers to use zoom because of its "wider options and clearer characteristic in comparison with Google meets and Microsoft teams" as she said.

Zoom platform Alternative	
There is no other alternatives	7 interviewees
Google meets	2 interviewees
BigBlue Button	1 interviewee
Sum	10 interviewees

Conclusion

This study used the diffusion of innovation theory to explore the spread of the Zoom cloud meeting platform among Palestinian users in order to determine its extent among those who use it at work, whether they are students, academic professors, trainees in online courses, or employees, to comprehend the factors that contributed to the acceptance and adoption of this platform, and to identify the factors that could result in a poor diffusion and adoption of this new technology.

This qualitative study utilized semi – structured interviews to accomplish the goals of the research and answer its questions. These interviews were based on a pre-established set of questions which were asked to all respondents. Semi- structured interviews were chosen as a tool for study, because it's a flexible tool and gives the opportunity to ask follow-up questions to delve more deeply into topics addressed.

Ten interviews were done with diverse Palestinian Zoom platform users to discover the characteristics and determinants that motivate them to use and adopt Zoom, in order to have a clear idea about the factors that helped in Zoom platform diffusion in the Palestinian society. The interviews also aimed to reveal the reasons that might affect the platform rejection.

The study reached to the following findings:
1. COVID 19 pandemic and the subsequent employment of distance education primarily contributed to the diffuse of Zoom among university professors, students and other segments.
2. The fact that Zoom is free, easy to use, and does not require prior technical ability to run and use, are the most significant factors that influenced users to adopt it. Zoom platform provides the element of flexibility to its users since it compatibles with various devices, including computers, smartphones and tablets.
3. The study revealed that the Palestinian users benefit from Zoom platform in holding lectures, presentations, workshops or attending them without the need to travel, which helped to save time and money for users. As well as the feature of recording meetings and thus the possibility of returning to them at the time the users want.
4. In situations where face-to-face communication is challenging, the Palestinians also use it, especially during the intrusions of Israeli forces to the Palestinian cities, when traveling and moving pose a threat to life.
5. However, the interviewees noticed they need a high speed internet connection to use Zoom platform efficiently.
6. The study also discovered that some of the people interviewed did not use any other platforms but zoom because it provided them with enough functionality to complete their tasks. However, some of them said that they favor Google Meet over Zoom because, in contrast to Zoom, it doesn't require a high speed internet connection. Others mentioned using BigBlue Button as their preferred option because it is open source, allowing developers to add and adjust themes to their liking.

Further Recommendations

Several recommendations can be made in light of the study's findings. This study urges more research on how using the Zoom cloud meeting platform to establish social connections online affects family meetings and communication in Arab countries. In order to comprehend how this platform is used to hold press conferences and advertise items online, the study advises more investigation into the usage of the zoom platform as a communication tool for public relations and marketing tools.

These recommendations were made in response to the discovery that the majority of studies on the use and adoption of the Zoom platform focused exclusively on its use for academic and educational purposes, with insufficient research on its use and adoption in other areas of public relations, advertising, marketing, and social relations.

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Information technology, according to the ADDIE model on English subject teaching, enhances the learning achievement of Shunde Polytechnic students in China.

Jianming FENG
Learning Technology and Innovation Division, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi, Pathum Thani, 12110, Thailand
Jianming_f@mail.rmutt.ac.th, ORCID:0009-0007-4494-4088

Thosporn SANGSAWANG*(Corresponding author)*
Educational Technology and Communications Division, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi, Pathum Thani, 12110, Thailand
sthosporn@rmutt.ac.th, ORCID:0000-0002-7926-6949

ABSTRACT

The objectives of this study were to (1) investigate the efficiency of information technology according to the ADDIE model on English subjects to Shunde Polytechnic students in China, (2) compare students' achievements before and after learning through information technology according ADDIE model on English subject for enhance learning achievement of Shunde Polytechnic students in China, and (3) examine students' satisfaction with of using information technology according ADDIE model on English subject teaching for enhance learning achievement of Shunde Polytechnic students in China. The sample comprised 30 students at Shunde Polytechnic in China, derived through a purposive sampling technique. The instruments used for collecting the data were (1) The information technology according ADDIE model on English subjects for enhanced learning achievement, a student's pretest and a post-test, and a teacher satisfaction form. The statistics used for analyzing the data were percentage, mean, standard deviation, and the t-test for the dependent sample. The research findings revealed that applying basic information technology according to the ADDIE model on English subjects to enhance learning achievement was efficient by E1/E2 (82.40/81.33). The evaluation of content the information technology according to the ADDIE model on English subject teaching by the experts was totally appropriate at the excellent level ($\bar{x}$=4.78, SD. = .58), and the evaluation of media by the experts was totally appropriate at the excellent level ($\bar{x}$= 4.50, SD. = .58). After learning the application, the students' achievements were higher than before. The mean and standard deviation for before learning were 8.80 and 2.33, while for after learning, they were 16.27 and 1.48. The t-test score between before and after learning was 20.68, with a significant difference at the .05 level. According to Shunde Polytechnic, teachers' satisfaction with information technology according to the ADDIE model on English subjects for enhanced learning achievement was high, with a mean of 4.51.
Keywords: Information Technology, ADDIE model, English subject

INTRODUCTION

The teaching concept and the teaching method of Chinese higher Education have undergone significant transformations as a direct result of the widespread application of information technology, such as big data, cloud services, and social networks. The teaching of English as a topic in colleges and universities has started to shift toward a more individualized and diverse development because of the proliferation of new learning methods such as mobile learning, ubiquitous learning, Online Education, and flipped classrooms. Teachers of English as a subject at colleges and universities, as well as their students, have generally acknowledged and embraced the "Internet and education" paradigm of teaching English as a subject in colleges. The teaching that occurs before, during, and after English classes in college has been the focus of several recent improvements and innovations in the field. The lightning-fast advancement of information technology serves as a backdrop for this event, which is currently taking place. The "online plus offline" hybrid teaching approach provides a platform that is both convenient and rich in educational resources with the goal of expanding classroom learning beyond the traditional paradigm of a single offline course. This allows for the expansion of classroom learning beyond the typical single offline course. Such extensive resources not only provide a more humanized kind of technical support for the classroom instruction that college English teachers deliver, but they also consistently optimize both the classroom instruction that college English teachers deliver for the English topic as well as the classroom instruction that they deliver for the English subject. This, in turn, calls for the constant development and strengthening of the information abilities of college English teachers to connect digital material more effectively with English topic training. In addition, the teaching of English in colleges and universities should continue to make use of contemporary technology, namely the role that information technology plays in the instruction of non-native speakers. It is becoming increasingly important to investigate whether, to what extent, and under which moderator variables computer-assisted language learning (CALL) can produce more effective outcomes than traditional language instruction.

Over the past few decades, more and more different types of computer-assisted language learning (CALL) programs have been incorporated into language classrooms. One of the most significant problems that technology attempts to solve is that of Education.

A meta-analysis, on the other hand, is a statistical and quantitative procedure that integrates the findings of several separate research projects to reach a single overarching conclusion. Researchers looked at 67 articles and theses out of a total of 1,000 works that had relevant titles and abstracts to compile their findings for this investigation into the effects of educational technology on the teaching of the English language. From 2009 to 2020, each publication and thesis were considered for inclusion in this study; however, due to a lack of information, seven of the articles were not considered. In addition, SPSS (particularly its sub-branch, Kruskal-Wallis's test) and CMA were the two tools that were utilized to calculate and analyze the data collected for this study. The total effect size that was computed for studies under both fixed and random models was statistically significant. In addition, the analysis of impacts that were broken down according to the year in which they were published, the instruments used in research, and the research techniques showed that the effect size of those factors was significant. Technology-assisted English instruction has demonstrated both an effective effect size and the efficacy of this technology in the context of language learning (Rahmati et al., A., 2021).

English serves a significant purpose in the overall application process because it is a language topic. The education method that is primarily utilized in college English classes is that of indoctrination teaching in big groups. This is because college English is a public basic course. The assumption that Education should be focused on passing tests is strongly ingrained; teachers have a dominant position in the classroom, and students and teachers struggle to communicate effectively. The inability to increase pupils' comprehensive English language skills can have a favorable influence on the academic advancement and career development of such students. The advent of modern information technology has brought with it the potential to provide technical assistance and knowledge reserves. These two factors have contributed to the improvement of college English topic teaching material, the innovation of education models, and the strengthening of students' comprehensive application abilities. Teachers and students in colleges and universities should make full use of the auxiliary role that modern information technology plays in classroom teaching, after-class tutoring, practical application, and communication. In addition, teachers and students should take basic English knowledge reserve, application ability improvement, and cultural exchange integration as the main improvement spaces to effectively improve the performance of college English subject teaching. Students in college English classes rely mostly on memorization, and application assignments often consist of material reading and topic writing.

The traditional exam-oriented education ideology limits the communication aspect of English as a language subject and focuses exclusively on the English completion test as well as CET-4 and CET-6, ignoring the practical demand for English application ability in the admissions process, the employment market, and cultural interactions. Although English for Medical Purposes courses are becoming increasingly popular among nurses and nursing students in the East Asian region, relatively little study has been conducted to evaluate whether these courses suit the pragmatic or learning demands of students. This study aims to showcase the specific learning objectives and pragmatic needs of 66 South Korean nursing students who attended the Medical English course. The study analyzes the data collected from questionnaires and interviews to highlight the values and conventions of the discourse community that the students are trying to learn. According to the findings of the study, most students agree that there is a need for English for Specific Purposes courses; however, they report that the current courses do not fully fit their needs and expectations due to (a) an English-only classroom policy, (b) limited academic literacy in English, and (c) non-localized materials. While the majority of students agree that there is a need for these courses, they also report that the current courses do not fully fit their needs and expectations. The findings help language educators, policymakers, and researchers in the East Asian region better understand the importance of looking at the specificity of English for Medical Purposes courses and the student's unique needs, and they provide them with suggestions for enhancing the effectiveness and specificity of English for Medical Purposes courses (Choi, L., 2021).

However, although the country strongly advocates and develops higher education informatization, college English teachers cannot rapidly improve their informatization ability in a short time due to subjective, objective, or other factors. In addition, how to combine informatization with teaching reasonably and flexibly use informatization in teaching practice has become an urgent problem to be solved. All these problems will lead to the organic combination of these convenient resources and English subject teaching in the era of big data. However, due to subjective or objective factors, modern means cannot be combined with college English subject teaching, which to a certain extent also reflects that college English teachers' informatization awareness and ability need to be improved.

LITERATURE REVIEW

The Use of Information Technology According to the ADDIE Model in English Subject Teaching to Enhance Learning Achievement of Shunde Polytechnic Students in China. Information technology has significantly transformed the landscape of Education worldwide. The integration of technology in pedagogy has become increasingly essential in fostering effective learning environments. Shunde Polytechnic, situated in China, recognizes the importance of harnessing technology to enhance English subject teaching and subsequently improve learning achievement among its students. This literature review aims to explore the use of information technology, guided by the ADDIE model, in English subject teaching to boost the learning outcomes of Shunde Polytechnic students.

The Role of Information Technology in Education

Shunde Polytechnic makes use of digital resources to improve English subject teaching, thereby bridging geographic distances and providing a variety of educational tools. By boosting student involvement, interaction, and access to resources, this technology makes English education more efficient. The proliferation of mobile technology over the last decade has created a window of opportunity to usher Education into the 21st century. When it comes to the art of teaching and learning English, the incorporation of mobile technology creates a unique environment for Education on the part of both teachers and the students they teach. This is true for both parties involved. Because of this, carrying out an exhaustive evaluation of works that have been published in the past is necessary to discover areas where mobile technology might be utilized more effectively in English language teaching and training. The objective of this research is to carry out a Systematic Literature Review (SLR) to determine the fundamental factors that influence the teaching and learning of English through the utilization of mobile technology, as well as the existing research that contributes to the solution of the problems. According to the findings, making available appropriate educational technology is one of the most important critical success factors that can improve English Education and instruction. This paper identifies the most significant limitations and gaps that exist in the existing research on teaching and learning English through the use of mobile technologies (Shahrol et al.; H., 2020).

The ADDIE Model in Educational Design

Analysis, Design, Development, Implementation, and Evaluation make up the five stages that make up the ADDIE model, which is a well-known framework for the instructional design process. This model offers an organized approach to the development of curricula and instructional methods, which makes it an appropriate framework for the implementation of technology-enhanced English subject teaching. Educators at Shunde Polytechnic would evaluate their students' individual learning goals and requirements during this stage of the process. It would be helpful for the process of technology selection and integration to understand the specific difficulties and requirements associated with teaching English at the institution. During this step of the process, the educators at Shunde Polytechnic would assess the specific learning goals and requirements of their students. Understanding the specific challenges and requirements associated with teaching English at the university would be beneficial for the process of selecting and integrating technology. This would be helpful since it would be helpful.

Design: The design phase involves creating a blueprint for the instructional materials and technology applications. Educators would determine the most appropriate digital resources, platforms, and tools to achieve the desired learning outcomes.

Development: During this phase, educational content and technology applications are developed according to the design specifications. Shunde Polytechnic instructors would create digital lessons, multimedia resources, and interactive activities tailored to the English subject curriculum.

Implementation: Instructors would introduce the technology-enhanced materials into their teaching methodologies. This phase requires adequate training for both teachers and students to ensure a smooth integration of technology.

Evaluation: Continuous assessment is crucial in the ADDIE model. Shunde Polytechnic would employ formative and summative evaluations to measure the effectiveness of the technology-enhanced instruction. Feedback from students and instructors would guide improvements in the curriculum and technology implementation.

Impact on Learning Achievement

Multiple studies have pointed to the beneficial effects that incorporating technology into classroom instruction can have on students' overall levels of academic attainment. The utilization of multimedia, interactive simulations, and internet resources can boost student engagement, retention, and comprehension. Because of the use of the ADDIE approach in conjunction with information technology, Shunde Polytechnic can anticipate an improvement in the English language competency of its students as well as an overall improvement in their academic performance.

Students at Shunde Polytechnic can improve their academic performance thanks to the incorporation of information technology into the teaching of the English subject. This incorporation follows the guidelines of the ADDIE model. The educational institution can generate a stimulating and interesting learning environment by conducting an in-depth needs assessment of their student body, generating technologically improved course materials and resources, ensuring that technology is properly implemented, and analyzing the results of these efforts. The dedication of Shunde Polytechnic to utilizing technological advancements for the purpose of enhancing the teaching of English subjects is an important step toward securing a more promising educational future for the institution's student body. Validating the efficacy of this strategy and honing its use will require additional research as well as case studies. The ADDIE has five steps: Analysis, Design, Development, Implementation, and Evaluation. This research involves only analysis and design. This survey included Patuk 4 Public Middle School seventh graders. Data-gathering tools include observation sheets, interview guidelines, and validation sheets. The ADDIE approach has customized instructional materials to student characteristics, according to Core Competencies (KI), Basic Competencies (KD), Competency Achievement Indicators, table of contents, module activities, evaluation, and summary comprise the design. Statistics teaching uses RME processes to promote students' critical thinking. This research can continue during learning development, implementation, and evaluation (Hikayat et al.; H., 2020).

METHODOLOGY
Research Questions and Hypothesis
There are three research hypotheses as to the following:
1) The practical impact of applying information technology according ADDIE model on English subject teaching to enhance the learning achievement of Shunde Polytechnic students in China is statistically significant at a level of .05.
2) The level of satisfaction among Shunde Polytechnic students in China about information technology according to the ADDIE model on English subject teaching is high.

Conceptual Framework
Independent Variable

Dependent Variable

| ADDIE model |
| Step 1 Analysis |
| Step 2 Design |
| Step 3 Development |
| Step 4 Implementation |
| Step 5 Evaluation |

The effect of using information technology according ADDIE model on English subject teaching for enhanced learning achievement of Shunde Polytechnic students in China.

Students' achievements before and after learning through applying information technology according ADDIE model on English subject teaching are statistically significant at a level of .05.

Instructors' satisfaction among Shunde Polytechnic instructors regarding the incorporation of information technology to enhance the efficiency of learning achievement of students in English subject teaching is high level 4.5.

Figure 1.1 Conceptual framework of the effect of using information technology according to the ADDIE model on English subject teaching to enhance learning achievement of Shunde Polytechnic students in China.

Theoretical Perspective
Using the ADDIE method to integrate IT into English classes for Shunde Polytechnic teachers in China requires theoretical consideration. These viewpoints shape the IT curriculum and enhance learning. Theoretical viewpoints include:
1) Constructivism stresses active learning through meaningful experiences. IT integration can inspire students to use English language apps and resources online, collaborate on digital projects, and solve problems using technology. The ADDIE model and constructivist approach promote critical thinking and creativity through interactive and engaging activities. It can promote students' self-directed learning ability, problem-solving ability, cooperation and communication ability, information literacy, creativity and innovation ability, and critical thinking ability.
2) Cognitive Load Theory: Instructional materials should manage working memory. Shunde Polytechnic IT-integrated English lessons benefit from multimedia presentations, interactive simulations, and online quizzes. You can choose IT tools and resources to learn and remember in ADDIE's design phase. This strategy improves student learning outcomes, resource utilization, engagement, motivation, cooperative and self-directed

learning, and personalized feedback. Students will learn and develop cognitive skills better, increase academic achievement, and enjoy learning.

3) TRACK combines content, pedagogy, and tech. Shunde Polytechnic teachers use ADDIE to merge IT, English language curriculum, and efficient teaching. This perspective emphasizes connecting technology to learning goals and changing pedagogy to employ IT. Information technology, English language curriculum, and good teaching methods can boost student motivation, tailored learning support, learning space and time, and learning outcomes and grades.

4) Collectivism stresses networks and digital links in learning. Shunde Polytechnic teachers can connect students, teachers, and English language resources using social media, forums, and collaborative technologies. ADDIE's implementation phase encourages continual interaction, information sharing, and real-world applications of IT-enhanced language learning. It can strengthen the communication between teachers and students and promote the learning effect and personal development of students.

5) Ubiquitous Learning; Mobile devices and digital resources enable anytime, anywhere learning. IT-integrated English classes at Shunde Polytechnic enable students' study and practice on phones and tablets. ADDIE's evaluation phase can show if ubiquitous learning improves English. Enhance students' learning efficiency, flexibility, personalization, engagement, and creativity.

6) Universal Design for Learning (UDL) promotes inclusive and accessible Education by accommodating varied learning styles and demands. IT tools can help English language learners represent, participate, and express themselves in ADDIE. This guarantees that the IT curriculum is tailored to a wide spectrum of teachers. Teachers can provide more effective learning opportunities and promote the overall development of students. Let the student achievement have greater progress.

These theoretical viewpoints inside the ADDIE paradigm can help Shunde Polytechnic English teachers develop a well-rounded and innovative IT-integrated curriculum. Technology is strategically integrated to improve learning outcomes and create a dynamic and engaging educational experience. Rewrite IT theory. ADDIE model for Shunde Polytechnic English subject teaching in China. This mode of operation not only lets the students increase learning and enthusiasm but also lets the students greatly improve their performance.

Research of Methodology
The research methods used in this paper include literature analysis, observation, interview, and field research. Mainly based on article analysis and practical teaching experience, this paper explores the value and significance of the application of information technology in teaching English subjects.

1) The population: The population of this study was 120 students in grade 22 of English majors in the academic year 2023 of Shunde Polytechnic students in China. The sample of this study was 30 students in grade 22 of English majors at Shunde Polytechnic students in China during the school year 2023. They were selected by using purposive sampling as they were the students of the researcher's Counselor.

2) The research instruments consisted of (1) the effect of using information technology in teaching English subjects to enhance learning achievement of Shunde Polytechnic students in China, and (2) the content and media quality questionnaire for information technology according to ADDIE model on English subject teaching to enhance learning achievement of Shunde Polytechnic students in China.

3) learning achievement questionnaire of students between pretest and post-test scores using information technology in teaching English subjects.

4) Satisfaction questionnaires to assess the student's level of information technology in teaching English subject. The data were analyzed using E1/E2, Mean, Standard Deviation, and t-test. Variables: Independent Variables are information technology according to the ADDIE model on English subject teaching for enhanced learning achievement of Shunde Polytechnic students in China. Dependent Variables are (1) the learning achievement of students towards information technology in teaching English subjects, and (2) the student's satisfaction with the information technology in teaching English subjects. Content. The integration of information technology in college English teaching not only enhances the theoretical framework but also propels the further development of information technology. By investigating this amalgamation, we gain a better understanding of the practical application of information technology in college English teaching, as well as its ongoing development and changes. This also helps to identify any critical issues in current information teaching and to summarize teaching experiences, mitigating the shortcomings of traditional teaching methods while exploring the English teaching theory within the context of information technology. As such, this enriches and enhances the theory of education and teaching informatization, ultimately leading to an effective improvement in English scores. Performance.

Data amassment: The researcher experimented with an experiment was one group pretest and post-test test scores design; the population was selected by purposive sampling. The measure and statistics and assessment are the information technology in teaching English subject, pretest-posttest test scores, questionnaire of satisfying data were E1/E2, mean, standard definition, t-tests the dependent sample Statistics. Amassment statistics data after the

experiment and calculate (O1) and (O2) for the mean ($\bar{x}$)and also compared, arrangement for the experimental model by information technology in teaching English subject to enhance learning achievement of Shunde Polytechnic students to learn by themselves. (1) A request for cooperation with 120 students from Shunde Polytechnic in China., (2) Plan to use information technology according to the ADDIE model on English subject teaching to enhance the learning achievement of Shunde Polytechnic students in China., and (3) Process learning by using information technology in teaching English subjects; there are three steps: the goal of learning, creative thinking, construction knowledge; pretest; post-test; assess students' satisfaction; check pretest and post-test.

Data analysis
The statistics used to analyze data.
1) To The efficiency of using information technology to enhance the learning achievement of students in the English language according to criteria experiment by E1/E2.
2) Compare the learning achievement of students using information technology in teaching English subjects between pretest and post-test by t-test.
3) To assess the students' satisfaction through the information technology according to the ADDIE model on English subject teaching by mean and standard deviation.

Definition Perspective
The study discusses information technology, English subject teaching, and students' acceptance. 30 Guangdong-based Shunde Polytechnic students were examined. Shunde Polytechnic evaluated August-July 2023. Computer networks and software store, transfer and apply data. Current research outputs and accomplishments in a sector or subject are compiled and analyzed to determine research status at home and abroad. Theoretical foundations guide field research and practice. It contains several theoretical perspectives and models established by researchers and practitioners via significant research. Information technology, meaning information Technology (IT), refers to the technologies and tools involved in processing, storing, transmitting, and managing information. These technologies include computer science and software development, hardware devices, network communications, and technical applications related to information. It plays a vital role in modern society. It covers a range of fields, including but not limited to the following aspects (1) Computer science, including programming, algorithm design, data structure, artificial intelligence, computer graphics, etc., dedicated to the development and improvement of computer software and hardware., (2) Network communication: Involves the construction, management, and maintenance of computer networks, including the Internet, local area network, wide area network, etc., to achieve the transmission and sharing of information between different devices., (3) Database Management: This field focuses on how to organize, store, and manage large amounts of data, ensuring its security and accessibility. (4) Software development: Develop applications, mobile applications, websites, etc., to meet the needs of people in different fields., (5) Information security: Focuses on protecting information from unauthorized access, tampering and destruction, including network security, data encryption, etc., (6) Hardware technology: Includes the design, manufacture, and maintenance of computer hardware components, e.g., processors, memory, storage devices, etc., (7) Human-computer interaction; Creating user-friendly interfaces for computer systems and applications., and (8) Digital transformation: Helping organizations and enterprises use information technology to optimize business processes and improve efficiency to meet the requirements of modern digitalization.

The ADDIE Model is a widely used instructional design framework that stands for Analysis, Design, Development, Implementation, and Evaluation. It provides a structured approach to creating effective educational materials and courses. When applying the ADDIE Model of Information Technology (IT) instruction in teaching English subjects to Shunde Polytechnic teachers in China, follow these steps (1) Analysis: The analysis identified the specific needs and objectives of Shunde Polytechnic teachers related to IT teaching and learning for the English language subject. Understand existing knowledge and skills. Identify the most relevant and useful tools, technologies, and IT resources to enhance English language teaching., (2) Design a comprehensive plan that outlines the overall structure of the IT instruction for the English subject. Define the scope, learning objectives, and expected outcomes. Decide on the appropriate instructional strategies, methods, and content that align with the needs and goals of the teachers. Create a syllabus or curriculum outline that outlines the topics to be covered and the sequence of instruction., (3) Development of teaching materials and real resources, Creating presentations, videos, interactive events, online modules, and other content. Choose the IT tools and platforms to use to deliver recommendations, such as learning management systems. Communication tools and collaboration platform., (4) Implementation: Implementation: Delivering IT guidance to Shunde Polytechnic professors, hosting workshops, training, and online webinars. Providing access to online resources and the support and guidance needed to effectively use IT tools and technologies in teaching English., and (5) Evaluation; IT teaching affects English teacher tech integration. Assess and improve Help Shunde Polytechnic instructors customize courses. Technology-based English instruction boosts teachers' IT skills and confidence.

The English subject encompasses teaching content and objectives centered around the English language. Typically,

the subject covers listening, speaking, reading, writing, comprehension, and communication skills. It aims to enhance students' English language proficiency, including vocabulary, grammar, and pronunciation. In the education system, English is taught from primary to high school, with the teaching objectives and content varying according to the student's age and learning stage. English-related courses are also available at the university level to develop students' intercultural communication skills and professional English proficiency.

Shunde Polytechnic Teachers in China, meaning the Shunde Polytechnic, is an undergraduate institution situated in Foshan City's Shunde District in Guangdong Province, China. As a prestigious university with a rich history and excellent educational resources, Shunde Polytechnic boasts a team of highly qualified and professional educators. The faculty consists of professors, associate professors, lecturers, and various full-time teachers with extensive teaching experience and a diverse range of subject expertise. They typically hold master's or doctoral degrees from renowned universities and have distinguished themselves through academic research and practice. The faculty is devoted to providing superior teaching and actively engages in scientific research and academic exchange. They have earned a significant standing in the academic community and regularly participate in conferences, publish papers, and advance the discipline through innovation. Additionally, Shunde Polytechnic faculty members play active roles in school management and community service. They assume leadership positions in colleges and departments, organize various educational activities, shoulder social responsibilities, and make valuable contributions to the school's development and the local society's prosperity.

Significance of the Study
The research focuses on the following (1) This study outlines a teaching approach through the implementation of information technology according ADDIE model on English subject teaching. Currently, the field of information technology education is experiencing a period of significant progress. To effectively obtain large-scale and high-quality data and construct the optimal framework, we must gain theoretical grounding on foreign language instruction using information technology and big data analysis. To this end, we need to utilize information technology and big data technology, continually update, and improve the information systems, enhance teaching efficacy and overall quality, address various issues encountered during foreign language education and enhance learning achievement by students., (2) In information technology, according to ADDIE model on English subject teaching, teachers with their students recognize the formidable advantages that it ushers. Not only does it provide a fitting framework to learn and apply English, but it also effectively reinforces the proficiency of teachers themselves. By utilizing information technology in a manner that is both sensitive and appropriate, both teachers and students can make the most of the burgeoning benefits of modern science and technology to enhance the learning achievement of students., and (3) The effect of using information technology according ADDIE model on English subject teaching can enhance the learning achievement of students, change studying methods and methods, and strengthen students' learning. The use of information technology in English subjects includes access to learning resources, language learning tools, online collaboration and communication, multimedia learning, online assessment and feedback, and virtual practical experience, which is closely related to English subject learning. In the classroom, we need to take the development of information technology as an opportunity to deal with problems in time. Information technology makes a comprehensive analysis of the overall situation of students by using data processing ability, evaluates the overall situation and individual performance of students, and provides teaching references for teachers. Teachers can make full use of information technology, combined with intelligent computers based on data analysis collected by big data, fully grasp each student's personality characteristics and learning ability, formulate targeted teaching plans, teach students according to their aptitude because of overall teaching, combine differences and similarities, and effectively fill the links that traditional teaching cannot fill. Finally, achieve enhanced learning achievement for students.

CONCLUSION AND DISCUSSION
Conclusion
In the study of the effect of information technology according ADDIE model on English subject teaching for enhanced learning achievement of Shunde Polytechnic students in China, there are three major objectives: 1). study the efficiency of information technology according ADDIE model on English subject teaching to enhance learning achievement of Shunde Polytechnic students in China, (2) compare students' achievements before and after learning through information technology according ADDIE model on English subject teaching to enhance learning achievement of Shunde Polytechnic students in China, and (3) examine students' satisfaction with information technology according ADDIE model on English subject teaching for enhance learning achievement of Shunde Polytechnic students in China. The sample of this study was 30 students of English Reading subject at Shunde Polytechnic students in China during the school year 2022. They were selected by using purposive sampling. The research instruments consisted of (1) investigating the efficiency of information technology according ADDIE model on English subjects for enhance learning achievement in Shunde Polytechnic students, China, (2) comparing students' achievements before and after learning through information technology according to ADDIE model on English subject for enhance learning achievement to Shunde Polytechnic students, China, and

(3) examine students' satisfaction with information technology according ADDIE model on English subject for enhance learning achievement to Shunde Polytechnic students, China. Research Objectives to (1) Study the efficiency of information technology according to the ADDIE model on English subject teaching to enhance the learning achievement of Shunde Polytechnic students in China. (2) Compare students' achievements before and after learning through using information technology according to the ADDIE model on English subject teaching to enhance the learning achievement of Shunde Polytechnic students in China., and (3) Study the satisfaction of teachers who use information technology according ADDIE model on English subject teaching to enhance the learning achievement of Shunde Polytechnic students in China. The integration of information technology within the framework of the ADDIE model for English subject teaching at Shunde Polytechnic in China holds immense promise for enhancing learning achievement. This comprehensive review has underscored the potential benefits and importance of this approach in the context of Higher Education.

- **Alignment with Modern Educational Needs**: The global educational landscape is rapidly evolving, and technology plays a pivotal role in addressing the needs of the digital age. By adopting the ADDIE model and leveraging information technology, Shunde Polytechnic acknowledges the importance of staying relevant and meeting the learning expectations of contemporary students.

- **Customization and Flexibility**: The ADDIE model's iterative nature allows for continuous adaptation and improvement. This adaptability is crucial in addressing the unique requirements and challenges of English subject teaching. Shunde Polytechnic can tailor its instructional materials and technology applications to suit the diverse needs and learning styles of its student population.

- **Enhanced Engagement and Interactivity**: Information technology provides opportunities for interactive learning experiences that can significantly enhance student engagement. Incorporating multimedia, simulations, and online resources can make the English subject curriculum more engaging and accessible, ultimately leading to improved learning outcomes.

- **Data-Driven Decision-Making**: The evaluation phase of the ADDIE model emphasizes data collection and analysis. Shunde Polytechnic can harness this data to make informed decisions about the effectiveness of their technology-enhanced instruction. This data-driven approach allows for continuous improvement and optimization of the teaching process.

- **Global Reach and Accessibility**: Information technology transcends geographical boundaries, making educational resources and opportunities more accessible. Shunde Polytechnic can use technology to connect with a broader audience, including remote learners and international students, further enriching the learning experience.

- **Preparation for the Future**: Equipping students with digital literacy skills is essential for their success in a technology-driven world. The integration of information technology in English subject teaching not only enhances academic achievement but also prepares students for the challenges and opportunities they will encounter in their future careers.

In conclusion, the implementation of information technology according to the ADDIE model in English subject teaching at Shunde Polytechnic is a forward-looking and pedagogically sound approach. It aligns with the evolving demands of Education, fosters engagement, and has the potential to significantly enhance learning achievement among students. However, successful implementation requires a commitment to thorough analysis, thoughtful design, careful development, effective implementation, and ongoing evaluation. Shunde Polytechnic's dedication to this approach positions it as a leader in innovative and effective English subject instruction, ultimately benefiting both students and the institution. Further research and practical experience will continue to refine and validate the effectiveness of this approach over time.

Discussion
The discussion of the study on the information technology according ADDIE model on English subject teaching for enhance learning achievement to Shunde Polytechnic students in China is as follows (1) study the efficiency of using information technology according ADDIE model on English subject teaching for enhance learning achievement of Shunde Polytechnic students in China., (2) results of evaluation efficiency of information technology according ADDIE model on English subject teaching for enhance learning achievement of Shunde Polytechnic students in China. The average mean score of the ongoing score was 82.40, and the mean score of post-tests was 81.33, which indicated a substantial improvement in information technology according ADDIE model on English subject teaching for enhanced learning achievement of Shunde Polytechnic students in China.

The result revealed that the value of efficiency of E1/E2 was 82.40/81.33. To summarize, this online learning based on information technology according ADDIE model on English subject teaching to enhance learning achievement of Shunde Polytechnic students in China is developed according to the standard criteria 80/80 defined because there is a process for finding the effectiveness of lessons that are consistent with the research process that is accurate and clear., and (3) results of the evaluation of information technology according to the ADDIE model on English subject teaching for enhanced learning achievement of Shunde Polytechnic students in China by three content experts and three media experts. The results of the content quality assessment of information technology according ADDIE model on English subject teaching for enhanced learning achievement of Shunde Polytechnic students in China were evaluated by three content experts. The overall quality was excellent level ($\bar{x}$=4.78, SD. = .23). When considering each item, it was found that consistency between content and learning objectives, the content is interesting, content accurate, the language used in the content is appropriate for the learners, activities are consistent with the content, and the overview of the content is complete were excellent level ($\bar{x}$= 5.00, SD. = .00), respectively. The results of the media quality assessment of the information technology according ADDIE model on English subject teaching for enhanced learning achievement of Shunde Polytechnic students in China were evaluated by three media experts. The overall quality was excellent level ($\bar{x}$=4.50, SD. = .58). When considering each item, it was found that learning through information technology according ADDIE model on English subject teaching is easy to understand, easy to use, uncomplicated, and the details are clear and easy to understand were excellent level ($\bar{x}$= 4.85, SD. = .58), respectively. This may be due to the quality assessment process of information technology according to the ADDIE model on English subject teaching. There are the correct procedures and processes systematically through quality assessment from experts with real specific knowledge. Compare achievements between before and after learning through information technology according to the ADDIE model on English subject teaching to enhance the learning achievement of Shunde Polytechnic students in China. They presented the learning achievement of information technology according to the ADDIE model on English subject teaching to enhance the learning achievement of Shunde Polytechnic students in China. The mean score of pretests was 8.80, and the score of standard deviation (SD.) was 2.33. The result after using the information technology according ADDIE model on English subject teaching constituted a substantial improvement in students, which translated into a high post-test of 16.27 and standard deviation (SD.) of 14.8 and t-test analysis before and after the treatment of 20.68, which demonstrated a considerable difference was statistically significant at the .05 level. This may be due to information technology, according to ADDIE model on English subject teaching that enables participants to learn at their own pace and helps learning achievement goals. Study the satisfaction of teachers who use information technology according to the ADDIE model on English subject teaching to enhance the learning achievement of Shunde Polytechnic students in China. The results of the evaluation of students' satisfaction questionnaire on learning with information technology according to the ADDIE model on English subject teaching for enhance learning achievement of Shunde Polytechnic students in China by 30 students. The overall students' satisfaction was strongly agreed on level ($\bar{x}$=4.51, SD. = .50). When considering each item, it was found that English teaching in information technology can be innovative teaching methods strongly agreed level ($\bar{x}$= 4.67, SD. = .48) and. English teaching in information technology can provide rich learning resources. was strongly agree level ($\bar{x}$=4.60, SD. = .50), respectively. The new trends and opportunities exchange ideas and practices and promote transdisciplinary and cross-domain collaboration (Zhang et al., P., 2023).

Suggestion for Further Study
Based on the summary and discussion of the study, the researcher has several suggestions for further study as follows (1) The analysis resulted in better IT English teaching methodologies and courses., (2) IT English subject-specific teaching resources and tools are our goal., (3) IT English subject teaching strategy and collect data to assess its efficacy., (4) The experimental results from the deployment stage will evaluate information technology English teaching., and (5) recognizing teacher and student IT English teaching requirements, problems, and expectations. SRL approaches directly affected students' English proficiency, whereas self-efficacy indirectly did. This study suggests ways to include SRL tactics in English curriculum and instruction to boost Thai EFL students' self-efficacy (Li et al.; K., 2023).

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Introduction and Analysis of an Interlinear Qur'an Translation with Unknown Old Anatolian Turkish

Süleyman AKSU
Lecturer, Girne American University, Faculty of Education, Department of Turkish Language Teaching, Kyrenia/ TRNC.
E-mail: suleymanaksu@gau.edu.tr
Orcid: 0000-0002-4690-5062.

Erkan DEMİR
Asst. Prof. Dr., Girne American University, Faculty of Hümanities, Department of Turkish Language and Literature, Kyrenia/ TRNC.
E-mail: erdemir444@gmail.com
Orcid: 0000-0002-1424-3172.

Abstract

With the conversion of Turks to Islam, it is seen that Islamic works began to emerge in the field of Turkish language. Among these works, Qur'an translations have an important place. Qur'an translations are in the forms of tafsirs (commentaries), surah tafsirs and interlinear translations. Although interlinear translations are primarily seen in the field of Eastern Turkish, there is also considerable number of interlinear translations in the Anatolian field.

The fact that interlinear translations are verbatim translations is essential in that they reflect the vocabulary of their period. Although some academic studies have been conducted on these translations, there are different translations in our libraries and museums on which no scientific work has been conducted. The authors and copyist of some of these works are known, but most authors and copyists remain anonymous.

Turkish translations of Qur'an, which have a unique place importance in following the historical periods of Turkish language, are also essential in terms of language studies. They are of particular importance in terms of semantic research and lexicography, as they show how the new concepts that came with the religion after the Turks' conversion to Islam are expressed.

In this paper, the Old Anatolian Turkish interlinear Qur'an translation, registered at Turkish Manuscripts Department of the Library of Presidency of Religious Affairs with number 279/ 288, which reveals the richness of meaning and vocabulary of Turkish language, is being promoted and analyzed. This copy with some missing surahs and interlinear translations consists of 350 leaves in total. We do not have any information as to where, when, why and by whom the manuscript was written. This manuscript, on which no scientific study had been conducted so far, is examined using document analysis method.
Keywords: Turkish Language, Old Anatolian Turkish (OAT), Qur'an, OAT interlinear Qur'an translation

Introduction

Old Anatolian Turkish is the period of Turkish language which covers 13th to 15th centuries. In this period, several copyright and translated works were produced; however, translated works are in majority. The majority of translated works consist of Qur'an translations.

The most important features of translations produced in Old Anatolian Turkish period is that most of them are translated from Arabic and Persian. As regard their content, a majority of these translations are religious, and in this respect, the first examples are religious and instructive.

With the conversion of Turks to Islam, Islamic works began to claim their place in the field of Turkish Language. These works are Kutadgu Bilig, Divân-ı Lügati't-Türk, Atabetü'l-Hakayık and Divân-ı Hikmet, in chronological order. Qur'an translations, which consist of tafsirs, surah tafsirs and interlinear translations are also among these works. They are important as they have religious and didactic content and reflect the characteristics of their age.

The rapid spread of Islam among Turks starting from the 10th century represented a new era in Turkish history. This rapid spread is an important development not only for Turks but also for the world history (Şimşek, 2017). Faced with a new religion and understanding, the Turks needed the translation of the Qur'an in order to fulfill

the requirements of this religion, to perform their prayers consciously, and to adopt a lifestyle suitable for the Qur'an.

The fact that the language of the Qur'an is Arabic and difficult to understand made it necessary for the Turks to translate the Qur'an into Turkish. This sacred text was first translated into Persian by a committee of scholars from Transoxiana during the time of Emir Mansur B. Nuh (350-365 Hijri / 961-976 Gregorian) from the Samanids. This first Persian translation was prepared based on the 40-volume tafsir of Muhammed B. Cerir-i Et-Taberi. This tafsir was summarized while being translated into Persian, and an interlinear translation was made into Persian based on the Qur'anic text (Kara, 1983: 135).

Underline Qur'an translation is a translation method based on giving the words in Qur'an one by one with a method called underlining or interlinear. These texts are placed just below the original Arabic text and do not show Turkish syntax features. However, they are extremely important texts for Turkish vocabulary studies, in which the Turkish equivalents of Islamic terms can be followed as well as the historical course of Islamic terms in Turkish.

Interlinear verbatim translations of the Qur'an are also very important in terms of vocabulary. Translations made with Old Anatolian Turkish in the Anatolian field were added to these translations, the first examples of which were produced in Karakhanid-Khorezm Turkish. Compared with the translations of the Qur'an made in the eastern region, the translations produced in the Anatolian field are numerous. While the author and copyist of very few of these works are known, many of them are unknown. Although there are many academic studies on translations, there are still some that have not been studied.

According to Zeki Veledi Togan (1938), the translation of the Qur'an into Turkish was performed at the same time as its translation into Persian, probably by the Turkish members of the same commission. However, Abdulkadir Inan (1961) claims that, the translation of the Qur'an into Turkish took place about a century after its translation into Persian, that is, in the first half of the 11th century.

These translations, the first examples of which were made in Karakhanid-Khorezm Turkish (Rylands, TİEM 73, Central Asian Qur'an Tafsir, Uzbekistan, Hekimoğlu and Mashhad Copies), were followed from the XIV. century onwards by translations of the Qur'an, tafsir, surah tafsirs and interlinear translations, which were written in Old Anatolian Turkish in the Anatolian field and survived to the present day.

Translations prepared in the Anatolian field were prepared by three methods: interlinear, tafsir and surah tafsir. Most copies of translations in the Anatolian field, such as the copies in British Library, Bursa, Manisa, Sivas, TİEM 40, and Topkapı, were produced with the interlinear method. Most of these translations are translations of the Qur'an from the beginning to the end. Apart from these translations, there are also tafsirs with a large number of manuscripts in various libraries, such as the tafsirs of Cevahirü'l-Asdaf and Ebul'l-Leys es Samarkandi. Surah tafsirs are quite abundant in this period. In these tafsirs, only a chapter or a surah of the Qur'an is interpreted. The oldest known (H.730/ M.1333) tafsir of short surahs is the Tebareke Tafsir written for Süleyman Pasha, the son of Orhan Beg. Various studies have been carried out on these works, which are very important in terms of language and cultural history.

According to the available information, there are no translations of the Qur'an during the Seljuk period, which is the first phase of Old Anatolian Turkish. The translation of the Qur'an into Old Anatolian Turkish took place for the first time in the period of the Principalities following the Seljuks (Özkan, 2010: 517). Interlinear translations studied in the Anatolian field consist of the following: British Library, TİEM 40, Sivas, Bursa, Manisa, Kayseri, Önder, Leiden, Berlin Copies, and Topkapı Palace Museum Wards Library K.252; Tafsirs: Ebu'l Leys Semerkandî Tafsir / Enfesü'l Cevâhir, Cevâhirü'l Asdaf and Tafsir'î Aynü'l Hayat; Surah tafsirs: Tafsirs on Surah Yasin, tafsirs on Surah Al-Ikhlas, Tabareke tafsir, Fatiha tafsirs, Amme tafsirs, Surah al-Araf tafsir and Surah An'am tafsir.

Conversion of Turks to Islam Religion

With the power and unity of Islam in the Hijaz region, the Islamic armies drove Byzantines out of Syria after the Yarmuk War. The Islamic armies, which broke the power of Iran in the battles of Qadisiya (635) and Nihavend (641), came into contact with the Turks after reaching the river Oxus in their pursuit of the last Sassanid Emperor.

If the scattered Kalach tribes living between the Oghuz tribes in Georgia and Sistan region and the Kuhistan-Persian region are left aside, both the eastern and western branches of the Köktürk Empire were in an

interregnum period at that time, and effective aid could not be provided to the city kingdoms in the Transoxiana region.

In fact, the martyrdoms of Hz. Omer and Hz. Osman lie in the centre of Islam. As the struggle between Hz. Ali and Muaviye and the harici (extrinsic) revolts slowed the pace of the Islamic armies in the east, until the beginning of the eighth century, the encounters between the Turks and the Islamic armies could not go beyond the level of transborder operations. However, the appointment of Hajjaj-i Zalim as the Governor-General of Iraq, which included all the eastern regions of the Umayyad Islamic State, and his delegation of Kutayba Bin Muslim, one of the prominent commanders of the period, to Khorasan, inflamed warfare.

As soon as the Islamic armies dominated the Transoxiana region, they raided as far as Talas. It is understood from the fact that the Arabs preferred to resort to defense that the Arabs could not achieve decisive success against the Turks who engaged in armed struggle. Accordingly, the Turks' conversion to Islam was of their own accord, which also left echoes in Arabic works. For example, a Turk who was a civil servant in the private library of the Caliph al-Mamun said: "The Iranians and Greeks lost their country to others and became captives in their own homeland; the Turks did not give their homeland to anyone (Islamic Encyclopedia, Vol. 43)."
The religion of Islam and old Turkish beliefs and conceptions have a lot in common: Turks had been familiar with monotheism for a long time, they believed in the afterlife and the immortality of the soul, and sacrificed to God. In addition, the moral rules inculcated by the religion of Islam are also suitable for the combatant understanding. Jihad reinforced the Turkish view of conquest. These are the reasons why the Turks appeared before the world as the standard-bearer of the religion of Islam in a short time.

A Brief History of the Qur'an and Some of its Characteristics
The Qur'an was gradually revealed by Gabriel (as). Revelation was completed in 23 years. The revelations brought by Gabriel were immediately memorized by the Prophet and his companions, and then transcribed by the revelation scribes. Among those who served as revelation scribes to the Prophet, Zayd Bin Sabit, Halid Bin Walid, Ubeyy Bin Ka'b, Sabit Bin Kays and Muaviye Bin Ebu Sufyan can be mentioned in addition to the four Islamic caliphs.

Muslims attached considerable importance to the memorizing and learning of Qur'an. With the spread of Islam religion and increase of the number of Muslims, those who memorized Qur'an also increased in number. During the life of the Prophet Muhammad, nobody thought that the Qur'an should be written down and turned into a book. The reason for this was the possibility of new revelations to come as long as he was alive. However, immediately after the decease of Prophet Muhammad, as a result of the conversions from Islam and the martyrdom of many hafizes in the wars, Hz. Abu Bakr and Hz. Omar took precautions in this regard.

At the decease of Prophet Mohammad, the pages in the hands of those who composed the "Mushaf" by writing the entire Qur'an were not arranged in a certain order. Upon the insistence of Hz. Omar, Hz. Abu Bakr agreed to collect the Qur'an and turn it into a book, for which task Zayd Bin Sabit was appointed. First, all the Muslims were asked to bring the Qur'an texts in their possession, and to show two witnesses that these texts were written directly based on the Prophet's words. After a meticulous study, the texts of the Qur'an were combined and the first copy of the Qur'an was delivered to Hz. Abu Bakr. These were handed over to Hz. Omar after Hz. Abu Bakr, and to Hafsa, his daughter, after Hz. Omar's martyrdom.

Hz. Omar sent Muslims who knew the Qur'an by heart to Damascus, Palestine and the surrounding regions. As they left Mecca and Medina, they encountered new and different dialects of Arabic. Upon realizing that peoples in different regions were reading the Qur'an in their own dialects, Muslims who knew the religion of Islam and the Qur'an well began to feel discontent. In the period of Hz. Osman, it was decided to reproduce the copies of the Qur'an in order to eliminate this concern and a commission of four people was established under the chairmanship of Zeyd Bin Sabit. The commission took the copy of the Qur'an in the hands of Hz. Hafsa and reproduced it. Sources give the number of copies of the Qur'an as five or seven. These were sent to Mecca, Kufa, Basra and Damascus, and the first copy remained in Medina. Later, it was decided to burn the texts that did not comply with these Mushafs.

The copies of the Qur'an, which were dictated during the time of Hz. Osman, were lost in time. However, since many copies of them were reproduced, it was ensured that the Qur'an reached the present day without any changes. The Qur'an itself is divided into surahs and verses. The verses of the Qur'an are not arranged in the order of revelation, that is, in chronological order. The first verses are in the 96th surah of the Qur'an, Surah Al-Alaq. However, it is certain that the place of the verses was determined by the Prophet Muhammad.
Method

Qualitative research method and document analysis technique were used in this research. Document analysis includes the analysis of written materials containing information about the facts or events that are subject to examination. The sample of the research consists of the manuscript registered with the title of "The Holy Qur'an and Turkish Explanation" and with the asset number "288" in the Turkish Manuscripts Collection at the Ankara Library of Presidency of Religious Affairs. However, there is a contradiction regarding the asset registration number of the work. While the number 279 is written on the book, the current asset number of the work is 000018.

On Turkish Translations and Tafsirs of the Qur'an

Turkish translations of the Qur'an are extremely important in terms of language studies. They are especially critical for semantic research and lexicography, as they reveal how the new concepts that were introduced with the new religion after the Turks' conversion to Islam were expressed.

These works, which clearly display the expressive power of Turkish in the face of an extremely difficult-to-read text like the Qur'an, also make it possible to accurately determine the meanings of existing Turkish words at that time with the help of their Arabic equivalents. This sacred text was first translated into Persian by a committee of scholars from Transoxiana during the reign of Emir Mansur B. Nuh (H. 350-365/ M. 961 -976) of the Samanids. The book of tafsir translated into Persian is the 40-volume work of Muhammed B. Cerir-i Taberi. This tafsir was shortened while being translated into Persian, and an interlinear translation was produced into Persian based on the text of the Qur'an. Unfortunately, these and other such views are nothing more than conjecture, as we do not have any precise record of the first translation(s) of the Qur'an into Turkish or their date and nature.

Translations can be classified as interlinear verbatim translations, tafsir-based translations, and tafsirs. The Turks, who accepted the religion of Islam en masse, felt the need to translate the book of the new religion into their own language, Turkish. Today, we do not know when, where and by whom the first Turkish translation of the Qur'an was made. There are different opinions on this subject in the sources.

In the introduction part of the oldest translation of the Qur'an, which has survived to the present day, it is explained why and by who the translation was performed (Eckman, 1971). As it is understood from this explanation, Tabari's forty-volume Qur'an tafsir was presented to the ruler Mansur Ibn Nuh. The Samani ruler, who had difficulties in reading and understanding the commentary, asked for this Arabic tafsir to be translated into Persian. For this reason, he gathered the scholars of Transoxiana and asked for permission from them on the subject. Scholars stated that it was appropriate for those who do not know Arabic to read and write the Qur'anic tafsir in Persian. Thereupon, scholars from Bukhara, Belh, Samarkand, Ispicab and Fergana undertook the translation job with the order of the ruler (Naima, 1961).

Zeki Velidi Togan states that the first Turkish translation was made at the same time with the Persian translation. As evidence for this, he shows the Turk from Ispicab in the translation commission (Togan, 1959). According to this view of Zeki Velidi, it can be claimed that the first Turkish translation of the Qur'an was made in the 10th century. However, Fuat Köprülü and Abdülkadir İnan state that the first Turkish translation of the Qur'an was made in the first half of the 11th century (Köprülü, 2004).

The method used in early Turkish Qur'an translations is the method called "interlinear". Interlinear word translations are translations based on explaining Arabic words one by one with Turkish words. With this method, Turkish or Persian equivalents were given to each of the Arabic words. Turkish words are written in smaller and thinner letters just below the Arabic words. Translation of the Qur'an with this method is quite common. There are many copies of this type in libraries in Istanbul and Anatolia and in various libraries outside Turkey. Since Turkish sentence formation is often not followed in such translations, the Turkish translation is sometimes incomprehensible without looking at its Arabic. Finding Turkish equivalents for each word is a good method for deriving Turkish words and making affixes functional.

On the Copies and Translations of the Qur'an

The Süleymaniye Copy is a mixed language translation registered in the Süleymaniye Library Manuscript Donations Section no 3966. It was Nuri Yüce who introduced the work to the scientific world (Yüce, 1990). Later, under the direction of Nuri Yüce, Osman Toker wrote a master's study on the 109b-144a leaves of the manuscript (Toker, 2000). Nuri Yüce distributed the remaining parts of the work as a master's thesis to 4 students between 2005 and 2007, and thus the entire manuscript was studied (Müfettişoğlu, 2006).

The English Copy (Rylands), Manchester, is stored in the Arabic Manuscripts section of the Rylands Library, and the registration number of this translation is 25-38. By whom, when and where this translation was copied is

unknown, which is interlinear and verbatim. In this bilingual translation, Arabic words are given with their Turkish and Persian equivalents. This incomplete copy has 1145 leaves and 14 volumes. Janos Eckman prepared the dictionary of the work with its Turkish, Arabic, Persian and English equivalents (Eckman, 1976). Aysu Ata also worked on the translation in question (Ata, 2004). What distinguishes this copy from the others is the existence of Persian-Turkish equivalents.

The Süleymaniye Copy was translated by Gülden Sağol Yüksekkaya (1993) as a doctoral study. It is a complete copy, but the copyist and the place where it was written are unknown. This translation, dated 1363 Gregorian, has 583 leaves. It is kept at Süleymaniye Library Hekimoğlu Ali Pasha collection, number 2. Janos Eckmann gave technical information on the copy. Previously, this copy was kept in the National Library, at Hekimoğlu Ali Pasha number 951. The most distinguishable feature of the copy is that some rules are given in Persian.

The Qur'an translation known as Turkish-Islamic Art Museum Copy, which is described as the oldest of the existing Qur'an translations, is interlinear and was created by giving direct Turkish equivalents to Arabic words. The most important feature that distinguishes this copy from the others is that the copy date and the copyist are known. It was copied by Muhammed B Haji Devletşah from Shiraz at the beginning of the 14th century, and the place of copying is believed to be Shiraz. This 902-page translation is kept in Istanbul Turkish and Islamic Arts Museum (TİEM) number 73. Abdullah Kök and Suat Ünlü conducted doctoral studies on the work under the supervision of Sema Barutçu.

It is not clear by whom, when and where the Anonymous tafsir was written. It is known as Central Asian tafsir or Anonymous tafsir (Borovkov, 1963). This translation of the Qur'an has a complicated structure. Sometimes it shows the features of verbatim and sometimes commentary translation. It is seen that the stories about the surahs are also included. The work was discovered by Zeki Velidi Togan in 1914. Halil İbrahim Usta (1989) prepared a master's thesis on the work. Borovkov (1963) developed the dictionary of this translation which was translated into Turkish (Usta and Amanoğlu, 2002).

The Uzbekistan Copy is the translation of the Qur'an registered with the number 2008 in the Uzbekistan Academy of Sciences, Ebu Reyhan El Biruni Institute of Oriental Studies. This incomplete copy has a total of 273 leaves. We do not have any information about where, by whom, when and why the Uzbekistan copy was written. The distribution of the surahs in this translation, which consists of a total of five surahs, is as follows: The 2nd surah is complete (with deficiencies), the 3rd surah is complete, the 4th surah is complete, the 5th surah is partial (verses 1-117), and the 6th surah is also partial (verses 71-136). A. A. Semenov was the first to introduce this translation of the Qur'an to the scientific world (Semenov, 1957).

An Interlinear Qur'an Translation with Unknown Old Anatolian Turkish
This translation of the Qur'an, registered in the Department of Turkish Manuscripts at the Library of Presidency of Religious Affairs, numbered 279/288, is an interlinear translation. This copy, which does not include interlinear translation of some surahs, has a total of 350 leaves. We do not have any information about where, by whom, when and why the manuscript was written.

Surah Fatiha is lacking in the manuscript. The first five verses of Surah al-Baqara have not been translated either. The translation of the last eleven pages of the third surah, Al-i Imran, is missing. There is no translation of the first twelve pages of the fourth sura, Surah Nisa. The first line of the fifth surah, Surah Maida, has been translated above the line.

A part of a verse of Surah At-Tawba has been deleted. There is no middle part of the verse above the line. Part of the verse belonging to the Surah Yunus in the third line of the second page of leaf number 119 has been deleted. The first word of the verse, which is on the second page of leaf number 137 and belongs to the Surah Yusuf, is indistinct. In leaf 138, the first word of the verse belonging to the same surah is deformed, and there are translation words both above and below the line. There is no middle part of the verse in the third line, which is on the first page of leaf 145 and belongs to the Surah Ibrahim.

Although the title of the surah on the first page of leaf number 158 is Isra, the author used the word Israel as the name of the surah. This name was given to the surah by mistake. Part of the verse in the sixth line of the Surah Ahzab in leaf number 240 has been deleted. The title of Surah Fatir, which starts on the second page of leaf number 249, is written as "Melâike".

On the second page of leaf number 257, a part of the verse belonging to the Surah Saffat in the eighth line is deformed. Likewise, in the ninth line of the same leaf, the first words are deformed and some of them have been

deleted, and there is no translation of these words. The Surah Fussilet, which starts on the second page of leaf number 275, is included in this copy with the title "Secde".

Part of the word, which is on the first page of leaf number 313 and belongs to the Surah Vakıa, are overlaid. Part of the verse at the beginning of the page, which is on the second page of leaf 314 and belongs to the Surah Hadid, are deleted. Part of the verse belonging to the Surah Tahabun, on the ninth line of the first page in leaf number 327, was written in red ink, but its translation was not written. The first word of the verse on the second page of leaf number 330, which belongs to the Surah Mulk and is in the first line, is colored red in the same way. The last part of the first line is overlaid on the first page of leaf 331, which is due to a clerical error. There are no errors in the remaining of the verses, and they are in the order of the Qur'an.

On the first page of leaf number 338, a part of the verse on the fifth line, which belongs to the Surah Cin, is colored red. The title of the Surah Insan on the second page of leaf number 341 is given as "Dehr". On the second page of leaf number 344, a part of the verse belonging to Surah Nebe in the fourth line is colored red. The last section of the verse belonging to the Surah Naziat in the sixth line of the second page of leaf number 345 is colored red. The parts that we describe as "colored red" when giving information about the copy are due to the author's clerical error. In order to correct this mistake, the author either overlaid the verse he wrote incorrectly or colored it red as we said.

Most of the parts in the last parts of the copy, which include Surah Infitar and Surah Mutaffifin, are fragmented. In some pages, the verses are written out of line, and some explanations different from the translation are made in the margins of the pages.

Surahs that are missing in the copy are as follows: Surah Fatiha, Surah Takvir, Surah Inshikak, Surah Buruc, Surah Tariq, Surah Ala, Surah Gashiye, Surah Fecr, Surah Beled, Surah Leyl, Surah Duha, Surah Inshirah, Surah Tin, Surah Al-Alak, Surah Kadir, Surah Beyyine, Surah Zilzal, Surah Adiyat, Surah Karia, Surah Tekassur, Surah Asr, Surah Kafirun (there is only the basmala at the beginning of the surah, there is no surah itself), Surah Nasr, Surah Tebbet, Surah Ikhlas, Surah Felak, Surah Nas.

The Importance of Old Anatolian Turkish Interlinear Qur'an Translations for Language Studies
Translations of the Qur'an in Turkish, made in different geographical regions and in different periods, have an important place in the history of the Turkish language. Although there are not many scientific studies on such translated works, they have been studied more meticulously than other works in the genre of verse and prose, and they have been introduced to the world of science with solid results.

These translations of the Holy Qur'an, which is a sacred text, were made with great care, both in its initial writing and during its copying. In this respect, the Turkish translations of the Qur'an play an important role both in illuminating the various periods of the Turkish language and in showing the line of development and change. These are the most important sources in terms of shedding light on several phonetic and semantic issues that we have difficulty in solving even today.

In the interlinear translations of the Qur'an, effort was paid to explain every Arabic word between the lines with a Turkish word. In this way, the semantic features and vocabulary of Turkish language in the relevant century were revealed. Since the verses of the Qur'an are adhered to and these verses are translated meticulously in interlinear translations, these translations are important for us to observe the semantic and historical developments and phonetic changes in the language.

Another feature of the translations of the Qur'an is that the Qur'an contains words belonging to different conceptual fields, as it has a legal character that regulates all aspects of life. As a PhD thesis, we translated the Old Anatolian Turkish Interlinear Qur'an Translation, which had never been studied before, registered with number 279 / 288 at the Department of Turkish Manuscripts at the Library of Presidency of Religious Affairs.

In translation studies into Turkish, original terms derived from Turkish roots were used instead of many Persian-origin terms that we use today as equivalents of Islamic terms. Translations of the Qur'an are important sources in terms of learning how the change of religion was reflected in the language and which of the terms of the old religions were used by the Turks for Islam. In the doctoral thesis titled "An Interlinear Qur'an Translation with Unknown Old Anatolian Turkish", the terms belonging to the old religious beliefs of the Turks were also used to meet the new terms in the interlinear translation of the Qur'an. From this point of view, our work bears special importance in terms of showing the source of our religious terms and explaining them.

Interlinear translations of the Qur'an are valuable resources for the Turkish language, especially in terms of lexicography. These are invaluable resources for the Turkish language atlas and historical dictionary. In the copy we translated, Turkish words were generally used, apart from some religious concepts related to prayer. In this study, the meanings given for the text of the Qur'an were meticulously researched, and the exact meaning of each word was sought.

Another issue in the translations of the Qur'an is that the Arabic equivalents of the words guided the translator and prevented him from resorting to interpretation. As a result of this guidance, the translator remained faithful to the original text of the Qur'an. The vocabulary of the translated work, which has 350 leaves, is substantial. In fact, it is qualified to cover almost the entire vocabulary of the Old Anatolian Turkish period. The Old Anatolian Turkish Interlinear Qur'an Translation, which we worked on as a doctoral thesis, is also important as it is among the main sources to be used in the preparation of the historical dictionary of the Turkish language.

Conclusion
The importance of interlinear Qur'an translations is that they are texts that reveal the richness of Turkish language. The main purpose of translating these texts is to enable people to read the sacred text of the religion they believe in their own language. For this reason, we witness a broad vocabulary in translated texts.
In this study, the interlinear translation of the Qur'an belonging to the Old Anatolian Turkish period, which is registered with number 279/288 in the Turkish Manuscripts Department of the Library of the Presidency of Religious Affairs, is presented and analyzed.

While translating the text, the differences with the other Qur'an translations were taken into account, with particular reference to the vowel points and orthographic features in the text. In order to minimize misreading and misevaluations, especially the internal structure of manuscript was taken into consideration. Accordingly, in this copy, which we have evaluated by considering the phonetic development of Turkish language, we have paid effort to read and evaluate correctly while preparing the transliteration of the work.

In this study, which we have prepared by taking into account the general characteristics of the Old Anatolian Turkish period, the copying errors that emerged for various reasons have been identified, and each of them has been explained separately in the section titled "An Interlinear Qur'an Translation with Unknown Old Anatolian Turkish". In addition, we also noted the differences and deficiencies in spelling, phonetics or syntax that we encountered while working on the manuscript.

The most important problem identified in terms of phonetics and spelling is that Arabic letters cannot completely meet some sounds in Turkish. Examples of this are the consonants ç, g, k, n, p and vowels o, ö, u, ü. In this regard, it has been found that the pronunciation of several words and affixes is different in the copy we translated.

Another finding is related to the spelling of affixes, which are written as adjunct to or separate from the roots and bodies of words according to Arabic letters. However, in the copy we translated, it has been found out that some affixes are written separately from the roots and bodies of words without any reason whatsoever. It is not easy to talk about a spelling tradition in Old Anatolian Turkish texts. Qur'an is a divine text; in order to translate and make sense of such a text, one has to be absolutely equipped. Translation activity is vital in the field of linguistics as it also manifests the resistance of the source language to the target language.

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Mobile-Assisted Peer Feedback for Oral Presentation Performance: L2 English Speakers' Perceptions and Practices

Burcu Gokgoz-Kurt
Kütahya Dumlupınar University
burcu.gkurt@dpu.edu.tr
ORCID ID: 0000-0001-7169-2890

ABSTRACT

Prior research has underscored the advantages of online peer feedback in language learning. However, there is a paucity of research that specifically investigates the use of mobile technologies for providing peer feedback for English as a foreign language (EFL) speakers' oral presentation performances. The present study aims to examine the types and targets of peer feedback provided by EFL speakers, along with their views and experiences with mobile-assisted peer feedback. A total of thirty-two university students, enrolled in an upper-intermediate to advanced-level rhetoric and oral communication class, used an online platform to anonymously provide feedback on their classmates' oral presentations over a four-week period. Additionally, the participants completed a post-study survey to assess their perspectives and experiences. The findings indicated that the students' feedback predominantly comprised positive remarks than negative critiques. The primary aspects covered by both forms of feedback comprised three major areas: presentation content, spoken performance, and oral presentation skills. Survey results also revealed that, despite expressing concerns about potential friendship bias, anonymity, and issues related to lack of proper attitude in the expression of feedback, EFL speakers generally viewed mobile-based peer feedback positively.

Keywords: EFL learners; EFL speakers; L2 English; L2 speaking skills; MALL; negative feedback; peer assessment; peer feedback; technology; TELL

INTRODUCTION

Developing oral presentation skills has been recognized as crucial in demonstrating speakers' competence in using the second language (L2) appropriately and fluently. As well as being used as a method of assessment in language learning, these skills also facilitate success in academic and professional settings (Hill, 2003). One significant aspect of fostering L2 speakers' presentation skills lies in providing constructive feedback. However, for logistical reasons such as large class sizes and limited time (Lam, 2010) offering timely and detailed feedback on L2 speakers' performance, despite its merits, may pose a challenge for language teachers.

Mobile technologies have opened up new avenues for language learning and assessment by empowering teachers and learners inside and outside the classroom, transcending traditional classroom learning methodologies. A number of studies have demonstrated the effectiveness of mobile tools in providing feedback in language learning classrooms (e.g., Dai & Wu, 2022; Xu, Dong, & Jiang, 2017). Peer feedback, which enhances learning, self-reflection, and self-regulation (Liu & Lee, 2013), has received increasing attention in technology-enhanced learning contexts due to benefits such as anonymity and convenience (Vanderhoven, Raes, Montrieux, Rotsaert, & Schellens, 2015). Despite the benefits, the effects of online peer feedback on speaking or oral presentation skills have been limited, especially through the use of mobile technologies (Xu & Carless, 2017). The present study aims to investigate the types and targets of peer feedback that English as a foreign language (EFL) speakers at a higher education institution provided for their classmates on their performances in oral presentations. Additionally, it seeks to examine EFL speakers' perceptions and practices in providing and receiving mobile-assisted peer feedback. For convenience, to refer to participants in this study, the phrases EFL speakers, L2 speakers, and students will be used interchangeably.

LITERATURE REVIEW

Feedback is a vital component of language learning, regardless of whether one is aiming to master grammar and vocabulary or improve pronunciation. From a historical perspective, there has been a diversity of approaches in the conceptualization and implementation of the term feedback. According to the behavioral theory of learning, feedback serves to improve performance through the correction of mistakes and the transmission of information from the teacher to the student (Yang & Carless, 2013). Under this view of feedback, learners are considered passive receivers of feedback while teachers are the authority (Carless, 2015; Papi, Rios, Pelt, & Ozdemir, 2019). On the other hand, in a more socio-constructivist learning perspective, feedback is viewed as a collaborative process in which learners are the agents. Within this framework, feedback is defined as "a process through which

learners make sense of information from various sources and use it to enhance their work or learning strategies" (Carless & Boud, 2018, p. 1315). In this vein, Carless (2015), who underscored the importance of empowering learners by involving them in the assessment process, proposed a learner-oriented assessment framework wherein feedback is the key component. According to this framework, learners become the agents that potentially receive and produce the language.

Depending on the medium, context, and function of the feedback, there are a variety of approaches to classifications of feedback (Lyster, Saito, & Sato, 2013; Sheen & Ellis, 2011). Early work on the classification of feedback by Ur (1999) identifies two main categories based on feedback function: correction and assessment. In this view, while assessment informs learners "how well or badly [they] performed" correction gives them information on the particular "aspects of [their] performance: through explanation, or provision of better or other alternatives, or through elicitation of these from the learner" (p. 110). Later work on the corrective function of feedback by Lyster and Ranta (1997) proposed further categorizations of what they called corrective feedback (CF), which involved explicit correction, elicitation, metalinguistic clues, classification requests, recasts, and repetition. Partially supporting Ur's (1999) assessment category of feedback, Reigel (2008) used four different categories for positive feedback, which were affirmation, praise, nonverbal response (e.g., nodding), and laughter.

Learner-oriented views of feedback emphasize the importance of learners taking part in the assessment process, which supports the practice of peer feedback, in which learners evaluate each other's performance through written or oral assessments. Recent research has demonstrated that peer feedback is as effective as teacher feedback (Al Jahromi, 2020; Au & Bardakçı, 2020) and offers tremendous benefits in language learning settings (Chien, Hwang, & Jong, 2020; Dai & Wu, 2022;). As well as fostering critical thinking (van Popta, Kral, Camp, Martens, & Simons, 2017), peer feedback also prepares tertiary students for professional and academic life in that they are able to evaluate their peers' performance and provide critical and constructive feedback. (Huisman, Saab, van Driel, & van Den Broek, 2020). Following some previous research (Liu & Carless, 2006; Panadero, Jonsson, & Alqassab, 2018), the present study operationalizes peer feedback students' providing qualitative feedback on positive and negative aspects of performance without awarding any points to them.

In the context of the assessment of speaking skills, peer feedback takes on a particularly important role (Patri, 2002). As technology advances, innovative solutions are developed to enhance the effectiveness of peer feedback in the learning of foreign languages. Mobile technologies offer a wide range of opportunities for effective peer feedback in speaking and oral presentation skills (Burston, 2014; Ebadijalal & Yousofi, 2023; Wu & Miller, 2020). Peer feedback provided in EFL classrooms using mobile devices can be framed under mobile-assisted language learning (MALL). MALL, which is characterized "by the mobility of the learner and location" and "probability of handheld devices" (Palalas, 2011, p. 76-77), has been shown to enhance language learning experiences (Burston & Giannakou, 2022; Elaish, Hussein, & Hwang, 2023). The use of mobile devices, such as smartphones and tablets, offers a range of multimedia capabilities and communication tools that can be used to enhance language learning and teaching (Dai & Wu, 2022). Mobile devices facilitate the organization and management of peer feedback, ensuring that language users have access to timely, anonymous, and comprehensive feedback that they can refer to when refining their skills. MALL technologies have been proven to be effective in vocabulary development (Stockwell, 2010; Xodabande & Hashemi, 2023), reading skills (Li, 2022; Valizadeh, 2022) as well as listening and speaking (Demouy & Kukulska-Hulme, 2010; see also Xu, 2020) by promoting student engagement and collaboration (Çakmak, 2019; Reinders & Cho, 2010). Additionally, mobile-assisted peer feedback has also been associated with increased willingness to communicate, self-regulated performance, and self-confidence among EFL speakers (Ebadijalal & Yousofi, 2023). However, successful implementation of mobile-assisted peer feedback in language classrooms requires careful consideration of a number of factors, including the selection of the appropriate platform or app (see Ocampo & Panadero, 2023), the accessibility of technology and the need for effective guidance and support from teachers.

Specifically regarding mobile-assisted feedback on spoken performance, research by Xu et al. (2017) investigated EFL learners' perceptions of mobile-assisted feedback on oral production in the context of a Chinese university. Students enrolled in an EFL teaching course watched a video, then recorded voices retelling and continuing the story over the social communication app called WeChat. Both teachers took turns providing oral feedback on students' oral performance using the group on the app, with one teacher providing feedback each time. The analysis of the data from a post-study survey, student reflections, and interviews revealed a positive attitude towards mobile-assisted teacher feedback, including increased self-confidence and improvement in speaking skills through a higher amount of engagement in MALL activities. Although this study only looks at students' perceptions of teacher feedback via smartphones for improving oral skills, it is one of the few studies combining feedback and speaking skills in L2 English learning.

THE STUDY

In the literature, there has been limited evidence of the potential for mobile technologies to provide peer feedback on speaking or oral presentation skills. An exception to this is the case study conducted by Wu and Miller (2020), which examined the effects of mobile-assisted peer feedback in the context of a university in Hong Kong. Twenty-five participants enrolled in the English for Business Communication class were first provided with a sample business meeting recording in groups and then were asked to perform in the mock meeting which was later assessed by their peers. The peer feedback was provided in the form of score assignments and comments via a mobile app. The findings suggested that learners' views were mainly favorable regarding the use of mobile-assisted peer feedback while they reported various logistical issues (e.g., the small screen size of smartphones) and found the rubric insufficient in various ways. Further research is warranted for a better understanding of mobile-assisted feedback in English learners using different mobile tools and with English learners from different learning settings. Such an endeavor will help explore the specific perspectives, best practices, and challenges associated with the effective integration of mobile technologies in classes geared toward improving speaking or oral presentation skills. The present study seeks to investigate tertiary-level EFL speakers' views and experiences regarding the use of anonymous mobile-assisted peer feedback when assessing their classmates' oral presentations in a face-to-face class. To achieve this, the study aims to address the following research questions:

1. What are the distinct categories/types of mobile-assisted peer feedback that L2 English learners utilize for assessing their classmates' oral presentation performances?
2. What are university-level L2 English learners' beliefs about peer feedback and its value?
3. How do L2 English learners reflect on their experiences in receiving and providing mobile-assisted peer feedback for oral presentation performances?

METHOD

Research Design

This mixed-methods study (Mackey & Gass, 2021) aims to comprehensively investigate the L2 English learners' views and experiences with mobile-assisted peer feedback in a university-level English oral communication skills course. The convenience sampling method was used based on participants' enrollment in the course. It examined the in-class anonymous mobile-assisted feedback that EFL speakers provided on their peers' performance in oral presentations which were analyzed qualitatively. It also included a post-study survey with close-ended and open-ended questions providing both qualitative and quantitative data to examine EFL speakers' views regarding their views and practices. The ethical approval for the study was granted by the author's institution.

Participants and Context

The participants involved 32 sophomores majoring in English Translation and Interpreting at a state university in Türkiye. They were selected based on their enrollment in the Rhetoric and Oral Communication Skills I course offered in the Fall of 2021. There were initially 40 participants in the study registered in the class. However, the data from 8 participants were excluded from the analysis. Three students were unable to complete the survey, four of them did not attend the mobile-assisted feedback session at least once, and one student dropped out of the program. Therefore, only responses from the students who attended all four feedback sessions & the training and completed the post-study survey following the sessions were included in the data analysis. The mean age of onset of L2 English learning for the participants was 10 ($SD = 2.46$). Only 6 (19%) students had been abroad, and 18 (56%) students had completed a two-semester intensive English program at tertiary level. Participants rated their engagement with English outside of school as 6.94 ($SD = 2.0$), and the majority of them expressed using English for digital activities such as watching movies, chatting with online friends, using social media platforms, playing video games, listening to songs, and doing translation tasks. Out of 10, participants rated themselves as a feedback provider as $M = 6.81$ ($SD = 1.55$), their willingness to speak in class as $M = 5.72$ ($SD = 1.78$), and their willingness to speak like a native speaker as $M = 9.07$ ($SD = 1.57$). Finally, regarding the self-reported proficiency in listening, speaking, pronunciation, and overall English, the mean scores were 6.41 ($SD = 2.24$), 6.94 ($SD = 1.90$), 7.09 ($SD = 1.96$), 6.81 ($SD = 1.86$), respectively. All of the participants either completed a two-semester intensive English program prior to matriculation or passed a proficiency exam to prove that they held a CEFR B1 level in English.

Course

The course *Rhetoric and Oral Communication Skills I* is a 14-week course meeting 3 hours a week. The primary goal of the course is to improve students' clear and fluent use of English especially in academic and professional contexts through activities and tasks including oral presentations on academic and personal topics, and video and audio recording assignments. The data relevant for this study was specifically collected from a 6-week module which comprised information and practice on how to give oral presentations and how to give feedback to classmates on their performances during oral presentations. Prior to this module on oral presentations (informative and persuasive speech types), students covered and practiced impromptu, extemporaneous, and memorized speech. For each of those, only teacher feedback and voluntary peer feedback were provided, although it should be noted

that peer feedback was at a minimum level as students were not willing to provide feedback to their classmates. For planned speeches, the students were required to turn in an outline which was prepared as described in previous weeks. The structure of the module that provided the data for the present study involves preparation, presentation performance, and/or peer feedback and feed-forward (see Figure 1).
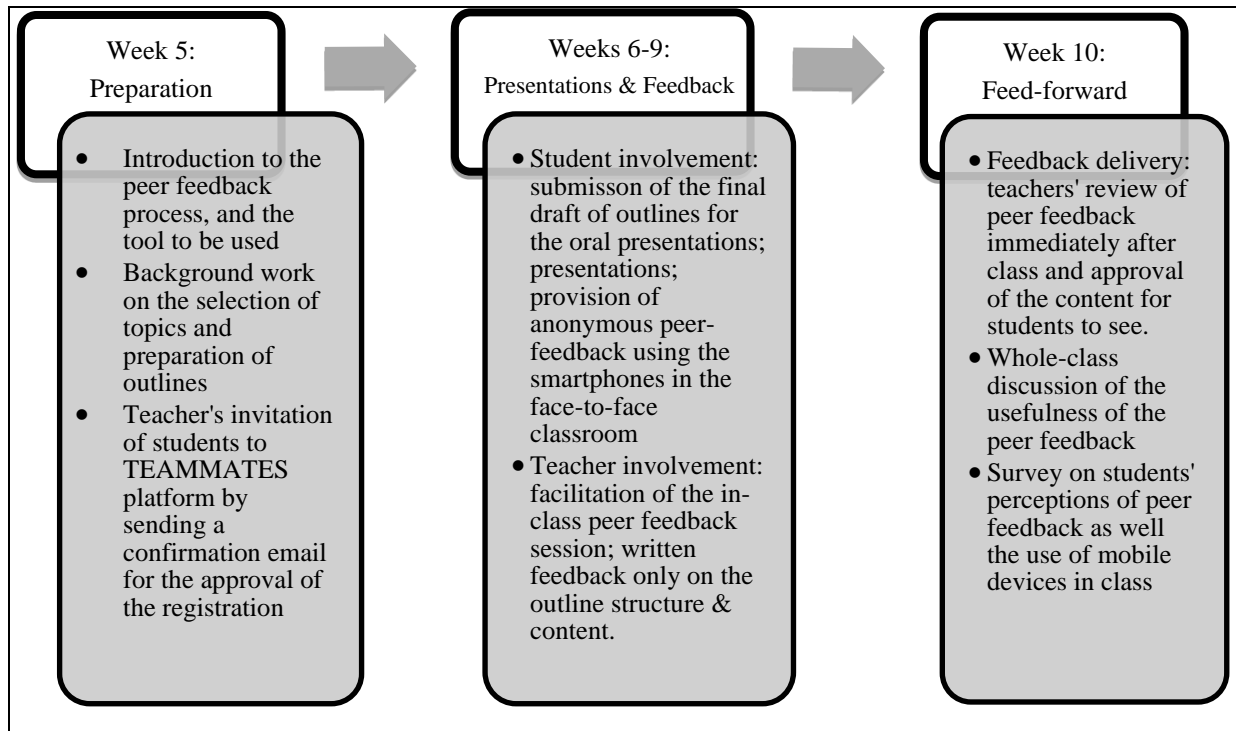
Figure 1. The structure and the flow of the course module

In the preparation stage, information about the process was provided by the teacher. She discussed the process and gave the students a short training on how to give constructive peer feedback on the oral presentation performance of their classmates over the following four class sessions. No specific rubrics or rating scales were provided on the type and amount of feedback to be provided. The students were guided primarily by the teachers' feedback. This feedback included holistic constructive oral feedback provided during class on students' short talks and other group work, as well as individual written corrective feedback on specific aspects of the final drafts of their outlines. The students were informed that their comments would be anonymous and not affect their grades. Each student presented twice over four weeks, which involved one informative and one persuasive speech. The information about those speech types as well as sample speeches were covered in the preceding weeks. Students had the flexibility to select topics that were both academically and professionally appropriate and aligned with the expected type of speech (informative or persuasive).

Materials and Procedure
There were two sources of data in this study: peer feedback provided by the students in class using the online platform and the survey responses. First, the data collection for the feedback content lasted for four weeks during which students provided feedback twice per speaker. When the semester was over, they completed a survey that consisted of three parts: a language and socio-demographic background questionnaire, a questionnaire on the participants' views about peer feedback, and a single open-ended question with sub-questions about EFL speakers' views about and experiences with mobile-assisted peer feedback. The second part of the survey was adapted from Hogg (2018) and Huisman et al. (2020). From Hogg (2018), seven questions (specifically, questions #2, 3, 4, 7, 8, 9, 10) out of 11 were adapted to make them clear and appropriate for the students and the context. All ten questions from Huisman et al.'s (2020) Beliefs about Peer Feedback Questionnaire were adopted by only making minor changes to the wording to fit the setting. While items on Hogg's (2018) questionnaire aim to reveal the participants' overall attitude towards the value of peer feedback in a more holistic way, Huisman et al.'s (2020) scale approaches the issue from a more pedagogical and instructional perspective. Finally, the last open-ended question was prepared considering the previous studies on mobile-assisted and traditional peer feedback on oral performance (Al Jahromi, 2020; Hogg, 2018; Huisman et al., 2020; Wu & Miller, 2020; Xu et al., 2017). The question that was included as the final question of the survey was "*What are your positive and negative thoughts about the use of mobile-assisted peer feedback you were involved in as a provider as well as a recipient during our class sessions? Explain your reasons, and feel free to mention your experience regarding the use of the platform.*"

As for the procedure, each EFL speaker in the classroom possessed a smartphone with an internet connection. To provide peer feedback, the students had to be registered with TEAMMATES (2010), which is an online feedback management system for education. With its powerful, flexible, and simple interface, TEAMMATES, which was developed with support from a variety of organizations, universities, and programmers, uses the infrastructure of the School of Computing at the National University of Singapore. It is an outcome of an ongoing non-profit project that still attracts developers as well as users from hundreds of universities with strong visibility control, and multiple options for the assessment of individuals and groups (see also Dooly, 2022). Since the online platform did not allow individuals to register, there was a need for the teacher to request access to the system and enter the student information for registering the students into the platform under the respective course. In week 5, each student was sent a link with login information for registration approval. During Week 5 and at the beginning of class in Week 6, any technological issues encountered by the students were resolved. Then, during Weeks 6 through 9, the system was activated for students to enter their peer feedback. Once each oral presentation was complete, the participants were given 3-4 minutes to provide feedback on their classmates' performance before the next presenter initiated their talk. Finally, the students completed a post-study survey investigating their views and experiences regarding peer feedback and the use of the TEAMMATES platform via their smartphones. Figure 2 is a sample print screen of the TEAMMATES platform with the instructions given to the students for writing their feedback after each presentation.
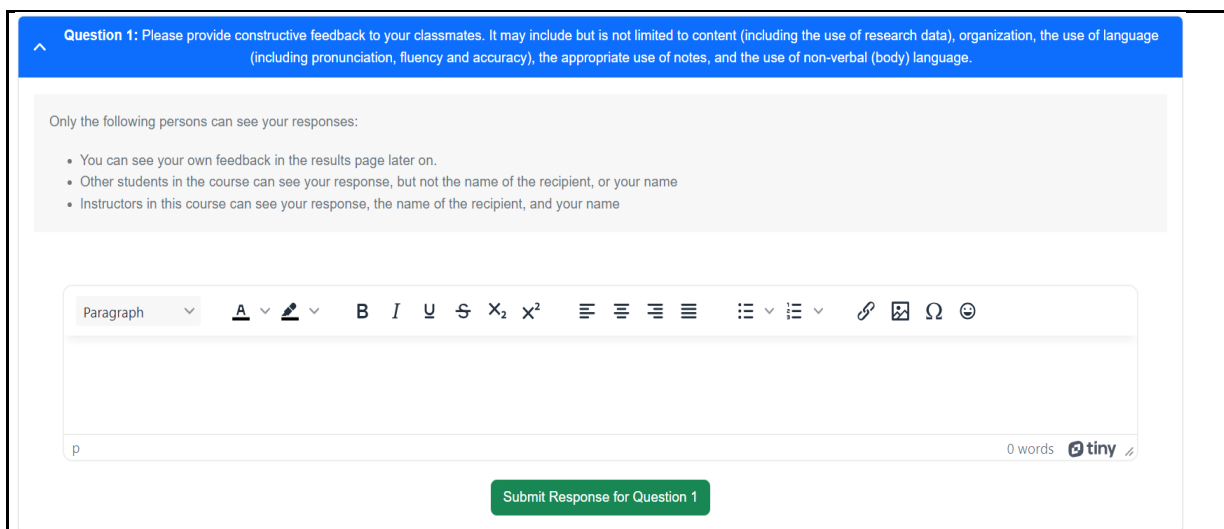
Figure 2. A print screen of the platform with the instructions feedback providers received

Data analysis

Both quantitative and qualitative data sources were used for analysis. The quantitative data was analyzed using descriptive statistics using mean scores and percentages as the unit of analysis. The qualitative data analysis was conducted for both responses to the open-ended question and the anonymized feedback comments from the four peer feedback sessions. In both, content analysis was employed to systematically analyze the data and to generate codes (Drisko & Maschi, 2016). For the qualitative analysis of the comments from the feedback sessions, data were coded using QDA Miner Lite v.2.0.9 (Provalis Research, 2018) to determine recurring linguistic and non-linguistic targets in the feedback. Instead of assigning feedback types to data, the holistic nature of the feedback led to coding based mainly on targets. Following Creswell and Miller (2000), the reliability and the validity of the coding were ensured by having an expert with an M.A. in language teaching code 15% of the peer feedback data and 25% of the responses to open-ended questions. There were a few major non-overlaps with the coding, but they were resolved. The inter-coder reliability score of Cohen's kappa was found to be high, $\kappa = .87$ (Cohen, 1960).

FINDINGS
Characteristics of mobile-assisted peer feedback

The first research question aimed to examine the type of feedback peers provided to each other. To achieve this, qualitative peer feedback was analyzed using content analysis. A total of 403 feedback comments were found to be eligible for the analysis which comprised 5043 words in total. Figure 3 demonstrates a print screen from the instructor's page on TEAMMATES while keeping students' personal information confidential.

Figure 3. Print screen of mobile-assisted peer feedback session results on TEAMMATES

The comments were categorized into two broad themes titled *positive* and *negative feedback* to capture all the data provided. No distinction was made between peer assessment vs. corrective feedback since the subcategorizations implemented in earlier studies (e.g., Xu & Peng, 2017) did not completely suit the feedback data provided in this study. Table 1 presents a summary of the feedback types examined.

Table 1. *Mobile-assisted Peer Feedback Type*

Feedback type	Coding frequency	%
Positive feedback	602	69.4
Negative feedback	265	30.6

The data presented in Table 1 indicates that students provided twice as much positive feedback ($n = 602$) as negative feedback ($n = 265$). A closer analysis of each of these categories revealed that each feedback domain comprised linguistic and non-linguistic targets suggested by peers. Table 2 provides the findings of the content analysis of positive peer feedback.

Table 2. *Positive Peer Feedback Targets*

Feedback target	*f*	Sample excerpt
Content and topic selection	156	*The topic was very interesting with excellent management of content. It was informative and full of nice points.*
Speaking skills		
Fluency	105	*It was a very fluent and effective speech with no hesitations. I liked it.*
Pronunciation & Accent	57	*I very much liked your accent and pronunciation. Your pronunciation was mind-blowing.*
Tone of voice	32	*The way you used your voice tone was great. It was high enough, too. It helped draw listeners' attention.*
Intonation	3	*The way you used the intonation of sentences was successful.*
Vocabulary use	9	*The vocabulary choice was great. The words you used for transitions were good.*
Oral presentation skills		
Eye contact	36	*You established eye contact with everyone, a hard task.*
Preparation	33	*It was obvious that you prepared your presentation well with very limited use of notes.*
Body language	32	*The use of body language and gestures speaks for themselves, with good control.*
Stage presence	25	*His presence in front of the audience was very successful in managing them and gaining attention.*
Self-confidence	12	*You kept your self-confidence high and it helped prevent any slips of the tongue/minor mistakes from prevailing the speech.*
Use of visuals	7	*Using the whiteboard for drawing graphs and noting numbers*

		was a successful strategy.
		She was able to stay calm and seem stress-free, which is a great
Anxiety Management	7	*thing in my opinion.*
Praise (with no Elaboration)	88	*Good presentation. I liked the presentation.*
TOTAL	602	

The most frequent feedback targets that students provided positive feedback on were content (topic selection, information quality, etc.), fluency, pronunciation and accent. Besides speaking skills, they were also able to focus on presentation skills and non-verbal communication channels. However, an important finding to note is that a majority of the feedback (*n* = 88) comprised praise without any elaboration (e.g., good presentation). The next broad category for peer feedback types was negative (& constructive) feedback L2 English learners provided. Table 3 illustrates how negative feedback was further classified into target domains.

Table 3. *Negative Peer Feedback Targets*

Feedback target	*f*	Sample excerpt
Need for enhanced content and topic selection	6	*The content was too generalized. It could be improved with specific details and research results.*
Speaking skills		
Need for improved fluency	20	*The speaker could have been more fluent. She was hesitant, stuttering, and stopped for no reason. I could not follow her.*
Need for improved pronunciation	13	*Sometimes the pronunciation was weak. You need to improve your pronunciation.*
Too low/high tone	12	*You should use your voice better by balancing the tone, without shouting maybe. It would be better.*
Excessive speed	7	*The speech contained a lot of dates and dense information. You spoke too fast.*
Need for improved intonation	3	*You need to improve your intonation. You sound too monotone.*
Oral presentation skills		
Excessive reliance on notes	73	*He constantly checks his notes, and it disrupts me.*
Inability to manage anxiety	45	*She was tense, and it caused her to lose control in the middle of the presentation.*
Little to no eye contact	28	*You should have established eye contact with the audience. Not with the teacher alone.*
Inadequate use of body language	22	*I believe the use of body language was weak and should be improved. I wish you had not turned your back on us.*
Excessive/inadequate speech length	15	*The presentation was too long despite its complicated nature; it should be shorter.*
Memorized speech	10	*I sensed that he memorized it all but forgot what to say next in the middle. This is not a good way of presenting.*
Need for improved stage presence	6	*You did not establish dominance/authority in class during the speech. Moving alone does not do it.*
Insufficient preparation	5	*I do not think she prepared well enough. Better preparation is needed.*
TOTAL	265	

The analysis of peer feedback content revealed that negative feedback provision (*n* = 265) was performed at half the rate of positive feedback (*n* = 602). The most commonly given feedback was about L2 English speakers' excessive reliance on their notes and their inability to manage their anxiety/stress. Eye contact and ineffective use of body language were also considered problems for the audience. To sum up, in their negative feedback, the students focused on the content, speaking, and oral presentation skills.

University-level L2 English learners' beliefs about peer feedback and its value
The second research question aimed to examine the participants' perceptions of peer feedback and its perceived value. The first seven questions in part two of the survey were included to measure the perceived value of peer feedback among L2 English speakers. Table 4 shows descriptive findings by item and overall mean scores.

Table 4. *Descriptive statistics for items measuring the value of peer feedback*

Likert-scale items	Agree	Neutral	Disagree	*M*	*SD*
Giving peer feedback to my classmates was a useful activity.	17 (53.1%)	13 (40.6%)	2 (6.3%)	3.69	0.89
Giving peer feedback to my classmates gave me relevant experience for my planned career.	15 (46.9%)	14 (43.8%)	3 (9.4%)	3.56	1.01
Being a peer feedback provider in this course did not develop any new skills.	3 (9.4%)	6 (18.8%)	23 (71.9%)	2.13	1.1
Peer feedback took valuable time away from other more valuable learning.	1 (3.1%)	14 (43.8%)	17 (53.1%)	2.19	0.93
I valued the way peer feedback helped me feel more powerful.	14 (43.8%)	12 (37.5%)	6 (18.8%)	3.19	1.09
More university courses should use peer feedback.	21 (65.6%)	8 (25.0%)	3 (9.4%)	3.84	1.14
Teachers should consider peer feedback in their grading.	16 (50.0%)	7 (21.9%)	9 (28.1%)	3.19	1.35

Note. The items were adapted from Hogg (2018). The category "Agree" includes the response options "Agree" and "Strongly Agree" on the Likert scale. The category "Disagree" includes the response options "Disagree" and "Strongly Disagree" on the Likert scale.

The remaining 10 questions in part two of the survey were adapted from the Beliefs about Peer Feedback (Huisman et al., 2020) and the descriptive statistics are provided in Table 5. The overall mean score of 3.79 indicates a positive attitude toward peer feedback. When the descriptive statistics are further examined, the lowest mean score is observed in the L2 speakers' confidence in the feedback they provided to their classmates ($M = 3.41$) followed by the peer feedback they received ($M = 3.86$). The highest mean score belongs to the value the participants attributed to the peer feedback as an important skill ($M = 4.04$). Overall the findings indicate that despite holding favorable attitudes towards peer feedback, L2 English learners were relatively less confident as feedback providers and receivers.

Table 5. *Descriptive statistics for beliefs about peer feedback scale and reliability indices*

Factors	Descriptives			Scale correlations				
	M	*SD*	α	Overall	VPS	CR	CO	VIM
VIM (3)	3.74	.81	.69	.91**	0.848**	0.557**	0.56**	–
CO (2)	3.41	.86	.83	.75**	0.626**	0.412*	–	
CR (2)	3.86	.79	.87	.75**	0.646*	–		
VPS (3)	4.04	.87	.87	.95**	–			
Overall (10)	3.79	.71	.91	–				

Note. The numbers in parentheses next to the factors indicate the number of items under the corresponding factor. *$p < .05$, **$p < .001$; VIM = Valuation of peer-feedback as instructional method (e.g., Involving students in feedback through the use of peer feedback is meaningful); CO = Confidence in own peer-feedback quality (e.g., In general, I am confident that the peer feedback I provide to other students is of good quality); CR = Confidence in quality of received peer-feedback (e.g., In general, I am confident that the peer-feedback I receive from other students is of good quality); VPS = Valuation of peer-feedback as an important skill (e.g., Being capable of giving constructive feedback is an important skill).

L2 English learners' reflections on their experiences in mobile-assisted peer feedback
The final research question was mainly about L2 English learners' reflections on their experiences with the mobile-assisted peer feedback process in their oral communication course. The data to address this question came from responses to a single open-ended question. Students expressed a variety of opinions about their experiences in giving mobile-assisted peer feedback on their classmates' oral presentation performances. Of 32, twenty-nine students found this implementation useful although they expressed hesitations. Some of the aspects L2 English speakers found useful and sample excerpts from their responses are provided in Table 6.

Table 6. *Positive Aspects of Mobile-assisted Peer Feedback*

Positive aspect	Sample excerpts from the responses
Awareness raising in performance	*I find it useful because the constructive feedback I received helped me view my performance from a different perspective and raised my awareness of my performance.*

Learning to tolerate criticism	*I think constructive ones were very effective because the best way to be good at anything is to be open to criticism.*
Opportunity to improve oneself	*The comments I received pushed me to try harder to develop my skills, and eventually improve myself.*
Receiving and giving objective comments with anonymity	*Especially for those who have difficulty, it was a good opportunity to see that it is okay to criticize your peers' performances.* *The comments were useful because anonymity makes the comments fairer and honest, which shows us how well we are doing our job, and this is the key to success.*
Increasing motivation and self-efficacy	*Positive comments increase trust and self-efficacy by motivating me to develop myself and show that I am on the right track.*
Collaborative learning	*By helping out each other, I think we both establish stronger relationships by caring about each other. Trying to understand our weaknesses, I think we learn together.*
Convenient and easy-to-use platform	*The platform we used was really useful and convenient. The interface was successful.*

As indicated in Table 6, students found their experiences with mobile-assisted peer feedback useful. Only sixteen students specifically mentioned the platform in their comments, and they were all positive especially because of the convenience and the anonymity it provided. Although almost all students were positive overall, they also expressed hesitations and various negative aspects regarding their use of mobile-assisted feedback experiences.

Table 7. *Participants' Reservations Regarding the Use of Mobile-assisted Peer Feedback*

Negative aspect	Sample excerpts from responses
Friendship bias	*My friends get very nervous during the presentations, so I don't think our classmates would make comments that would hurt anyone. It was both fun and difficult.* *If you are close to that person, for making a negative comment, you can stay in limbo, so sometimes I may have been afraid of breaking hearts.*
Inferiority in effectiveness compared to teacher feedback	*But of course, I think the teacher's feedback is more comprehensive and knowledgeable.* *I found the teacher's feedback more constructive & effective. While my friends' comments were mostly positive, I got more objective feedback from my teacher because she is an expert.*
Anonymity as a problem	*In my opinion, feedback should not be provided anonymously because, with the belief that "my name doesn't appear anyway," negative yet bold and unfair comments are made.* *It was very effective to receive anonymous feedback; however, as in social media, it is quite possible to go a bit far.*
Lack of proper attitude in expression	*I find it overall helpful, but I do not approve of feedback provided in a more negative tone.* *The only negative side was that some students were rude in their negative comments while staying in disguise.*
Discouragement caused by negative feedback	*Negative comments help us see our mistakes, of course, but they also discourage students who are unable to tolerate criticism and eventually have a negative rather than a positive effect on self-confidence.*

Despite the favorable attitudes towards the mobile-assisted feedback experiences students had in their classes, they mentioned various downsides as summarized in Table 7. The data in Tables 6 and 7 show that despite agreement on the majority of negative and positive aspects of their experiences, the students differed on specific points. One of them is the anonymity in peer feedback. While 17 out of 32 students considered anonymous feedback an advantage, 5 students mentioned that such feedback was not helpful mainly because it caused some peers to comment in a bad tone. It should be noted here that the teacher meticulously reviewed and edited the comments before sharing them with the students to prevent any potential issues. Second, some participants found mobile-assisted peer feedback both encouraging/confidence boosting/motivating ($n = 12$) while a few also expressed that negative comments were rather discouraging ($n = 4$). Finally, regarding the platform, participants did not mention anything negative about the platform they used.

Overall, the peer feedback provided by L2 English speakers, who were in the second year of their degree program in English Translation and Interpreting, was more positive than negative. The targets in both domains included linguistic as well as non-linguistic targets in content, speaking skills, and presentation skills (both verbal and non-verbal). Regarding their attitudes and experiences, they mostly held positive attitudes towards mobile-assisted peer feedback although they had concerns about friendship bias, quality and fairness of peer feedback, lack of proper tone in expression, and the discouragement that negative feedback brought about. As in previous studies, teacher feedback was regarded as superior to peer feedback, and anonymity was mentioned among the negative aspects by several students, potentially because of the negative and discouraging comments or expressions they received.

DISCUSSION

It is the objective of this study to advance our understanding of how mobile-assisted peer feedback is used to improve oral presentation performance among university-level EFL speakers. Despite the limited scope and location of the study, the findings provide valuable insights into the perceptions and practices of EFL speakers in providing and receiving mobile-assisted feedback from their peers.

First, based on the data collected over four weeks, the findings showed that EFL speakers provided positive peer feedback twice as often as they provided negative peer feedback. The feedback on performances comprised (un)favorable comments regarding aspects including content, anonymity, fluency, pronunciation, tone of voice, intonation, eye contact, body language, stage presence, preparedness, anxiety management, and use of visuals. Apart from these aspects, a considerable number of the students also praised presenters or their performances with no elaboration. Previous research examining the types and targets of technology-mediated peer feedback was mostly conducted in L2 writing (see Zhan, Wan, & Sun, 2022), in which feedback targets and types differed from those of oral skills. Limited research examining mobile-assisted peer feedback on oral skills used peer assessment with score assignments (out of 5) for various aspects/functions, e.g., fluency, and pronunciation (Wu & Miller, 2020) rather than asking them about their weaknesses/strengths. However, in their study, Wu and Miller (2020) only reported qualitative findings regarding the use of mobile-assisted peer feedback and the specific app used. In this respect, the present study provides complementary data on the types and targets of peer feedback provided.

Additionally, it is important to develop students' oral presentation skills and ability to give feedback to peers, as these skills are crucial for success in their future academic and professional lives. Although the present study did not ask EFL speakers to assign a performance score to their peers, this could be considered for further research. The present study shows that a comprehensive classification is needed for a better understanding of the types and functions of peer feedback on oral presentation skills as well as for designing relevant and effective rubrics for assessment. Finally, the content of the peer feedback revealed that a majority of the EFL speakers did not provide detailed corrective or elaborative feedback on their peers' performances. Usually, they either praised their peers/performances without mentioning specific points/words uttered by them, or they provided completely brief and general comments. However, one explanation for this finding could be that the purpose of peer feedback in this class was not to assign a score. Another possible reason could be that peer feedback was provided within a limited amount of time in class. This might have hindered students' focus on the details unless they took notes while listening. Consequently, the students provided more holistic feedback rather than corrective feedback. By carefully examining how they implement and define peer feedback, future studies may explore the expectations associated with peer assessment.

Second, the results of the study indicate that EFL speakers have a positive view of peer feedback and its value. They were comparatively neutral on making peer feedback a part of the official grades and felt least self-confident in receiving and providing peer feedback, which supports previous research (Wu & Miller, 2020; Xu & Peng, 2022). This indicates that despite having received a small amount of training, the students still did not feel confident. This could be because individual and social factors including prior knowledge, self-efficacy, relations among peers (Panadero et al., 2018), proficiency (Liu & Hansen, 2002), or motivation (Xu & Peng, 2022) have been shown to affect the peer feedback process. To minimize the negative effects of such factors, providing students with training on how to give appropriate peer feedback requires a significant amount of time. An extended period of training may be the most effective method in equipping students to provide quality feedback to their peers. In the present study, the training lasted for a single class session, and this might have affected the feedback outcomes negatively. Further studies involving learner training with clearer guidelines and practice opportunities are warranted.

Finally, learners' reflections on their use of mobile-assisted peer feedback practices have revealed various benefits and downsides. EFL speakers mostly commented on the positive aspects of mobile-assisted peer feedback such as increased awareness, tolerance, motivation, and self-efficacy. They further considered it an opportunity for learning and improving themselves and found the anonymity the platform offered very useful and convenient.

These findings are in line with previous research that reported favorable comments on mobile-assisted peer feedback provision (Wu & Miller, 2020). Anonymity has been regarded as a component paving the way for reaching reliable results in peer assessment (Vanderhoven et al., 2015; Zhao, 1998). Since anonymity was also maintained through the use of mobile technologies, most of the participants expressed satisfaction with the feedback they provided.

On the other hand, EFL speakers had reservations regarding the use of mobile technologies in peer feedback provision. The primary concern revolved around friendship bias, which they considered a significant factor influencing the nature and validity of peers' feedback to each other. Findings regarding this issue have been inconclusive in the literature (Vaughan, Saito, & Saito, 2016) as there are other intervening factors such as the character or the culture of the feedback provider/the receiver (Guardado & Shi, 2007). Interviews might help gain deeper insights into the issue and are recommended for further research. EFL speakers also expressed that they found teacher feedback to be of higher significance and reliability, which aligns with the findings of previous studies (e.g., Al Jahromi, 2020; Gielen, Tops, Dochy, Onghena, & Smeets, 2010). To raise students' awareness, during training sessions, the value of peer feedback, especially using mobile technologies, could be emphasized by making peer feedback a habit in classroom assessment. Regardless of whether it is considered an alternative or a main form of assessment, peer feedback remains an effective means of learning for language learners.

CONCLUSION
The purpose of the present study was to examine the type and functions/targets of the mobile-assisted feedback EFL speakers provided to their classmates. A secondary purpose was to understand their perceptions and practices regarding the use of an online platform for anonymous peer feedback provision. The findings revealed that students provided more positive than negative feedback to their classmates. Their perceptions and practices indicated a favorable view of the use of mobile-assisted peer feedback while holding various reservations regarding its use. Despite the limitations such as the small sample size, and the short amount of implementation and training, the study provides valuable insights and pedagogical implications.

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Organization Learning via Information Technology Teaching for Foshan University of Higher Education

Peng JUN LIANG
Learning Technology and Innovation Division, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi, Pathum Thani, 12110, Thailand
Peng_j@mail.rmutt.ac.th, ORCID:0009-0003-1514-9676

Thosporn SANGSAWANG**(Corresponding author)*
Educational Technology and Communications Division, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi, Pathum Thani, 12110, Thailand
sthosporn@rmutt.ac.th, ORCID:0000-0002-7926-6949

ABSTRACT
The objectives of this study were to (1) investigate the efficiency of Organization Learning via Information Technology Teaching for FOSHAN University of Higher Education, (2) compare students' achievements before and after learning through Organization Learning via Information Technology Teaching, and (3) examine students' satisfaction with of using Organization Learning via Information Technology Teaching. The study successfully collected 356 valid surveys from Foshan's vocational schools, resulting in a total of 370 questionnaires and a response rate of 96.2%, providing valuable insights into the reality of the situation in these institutions at FOSHAN University of Higher Education in China, derived through purposive sampling technique. The instruments used for collecting the data were (1) The questionnaire to enhance learning achievement, a student's pre-test and a post-test for FOSHAN University of Higher Education students., and a teacher satisfaction form. The data analysis statistics were percentage, mean, standard deviation, and the t-test for the dependent sample. The research findings revealed that the survey data from the Guangdong Vocational College of Environmental Protection Engineering revealed that most teachers were female, with a higher proportion of females than males. Most teachers were between 30-40 and 40-50, with a higher proportion of those between 50 and 60. The survey also revealed that 59% of the teachers held postgraduate degrees, while 14.6% held doctoral degrees. Most teachers at the college were lecturers, with 46.6% holding the lecturer position and 41.3% being associate professors. The proportion of teachers at the college was 28.4%, compared to 21.3%. The dependent variables in this study pertain to college teachers' information-based teaching capacity, including the ability to use information-based tools, develop teaching methods, create resources, and execute teaching practices. The National Guide to Teachers' Educational Technical Capacity in Colleges and Universities was used to evaluate the information-based teaching capacity of college instructors. The study found a significant association between technology perception, task flexibility, convenience, social influence, and the transfer of information in college classroom education. The convenience factor, which refers to the teachers' ability to utilize and implement technology efficiently, was a significant factor in adopting information-based teaching. The study highlights the importance of assessing the instructional proficiency of college educators and the social impact of information-based teaching.
Keywords: Information technology, Teaching Transformation

INTRODUCTION
Technology development in higher Education has transformed teaching and learning, enhancing materials, promoting active learning, and increasing assessments. However, challenges include insufficient teacher capacity, training, and resource distribution. Educators must strengthen IT abilities, improve classroom environments, and encourage independent learning and innovation to promote teaching transformation. This study examines Foshan City's higher vocational institutions' IT use and aims to improve teaching and learning outcomes. Information technology has significantly influenced how people produce, live, and think in the 21st century as it has permeated profoundly into all facets of human social life and has done so at an unprecedented rate. The swift advancement of information technology has encouraged the transition of traditional artisanal production methods into more mechanized production methods, which has resulted in a significant increase in the effectiveness of production. At the same time, the widespread use of the Internet has paved the way for the development of novel digital production techniques and created a more open and transparent communication channel between manufacturers and customers. (Liao Qian, 2023) The way people live their lives has also seen significant shifts in modern times. People can realize an online lifestyle by purchasing various commodities, watching movies, and accessing digital resources on the Internet using mobile terminals or laptops and other devices. Online shopping and ticketing have become the trend of the times. People may now connect by voice and make video calls thanks to the proliferation of chat software such as WeChat and QQ. These programs have gradually supplanted traditional telephone

communication. People will be able to break through barriers of time and distance and rapidly obtain the most recent news both domestically and internationally because of advancements in information technology, which will turn the globe into a global village. Arguing that advances in information technology will continue to move humanity toward a more intelligent future is not an exaggeration. The revolutionary impact of information technology, which has led to the emergence of significant new phenomena, has also influenced the field of Education. "Information technology has a revolutionary impact on the development of education and must be given great priority," declares the Outline of the National Medium- and Long-term Education Reform and Development Plan (2020-2030) (Zhou Jinzong, 2023). Information technology is gradually making its way into Education and teaching. The renowned educator Gu Mingyuan has mentioned that changes in the information society, particularly innovations in science and technology, are changing the ecological environment of Education and the concepts and methods of Education (Zhu et al., 2023). The conventional methods of Education are undergoing a process of redefinition, and new educational settings are coming into being. Not only has the proliferation of information technology transformed conventional approaches to Education, but it has also made it easier for educators to collaborate on developing new instructional strategies and shared educational resources. Educators everywhere have recently noticed that a hot topic should be incorporating information technology into educational programs (Pu Jili,2023). In higher Education, innovative teaching techniques such as flipped classrooms and smart teaching have become widespread, pushing the boundaries of conventional teaching. Higher Education is undergoing continuous reform and innovation, primarily due to the impact of information technology. In order to improve the quality of Higher Education, the "Outline" emphasizes promoting information about higher Education, modernizing educational content, teaching methods, and teaching approaches, innovating talent cultivation, research organization, and social service models, and promoting cultural inheritance and innovation. (Zhang Xia,2023).

Therefore, research on employing Information Technology Teaching for Organization Learning at FOSHAN University of Higher Education. Because of this, creating new methods of Education and Education overall can lead to significant theoretical and practical advancements. At the same time, the rapid growth of information technology has led to an increase in the complexity of the challenges associated with the transformation of teaching in higher Education. Practitioners in Higher Education face several obstacles, including supporting the transformation of teachers' teaching principles, overcoming issues in teaching using information technology, and assuring the proper implementation of individualized learning for students. Because of the complexity of these challenges, in-depth research and investigation are required to give a scientific foundation and practical guidance for the expansion of higher Education.

LITERATURE REVIEW
Foshan University, a renowned educational institution in China, faces challenges integrating information technology into its instructional strategies due to rapid technological advancements. This literature review investigates organizational learning through IT teaching methods, focusing on Foshan University's educational challenges in this technologically advanced environment.

Theoretical Underpinnings of the Learning Process in Organizations
Acquiring new information and putting that information to use within the framework of an existing organization are the two main components of the dynamic process known as organizational learning. This process is not only centered on the person but also extends to the construction of collective knowledge within the organization, forming a common cognitive framework. Learning inside an organization is a dynamic and necessary process that encompasses acquiring, interpreting, and applying information to improve performance and adapt to changing surroundings. This learning can take place within any business. This idea is based on several significant theoretical foundations, each providing a unique perspective on how organizations learn and develop throughout time. Organizational learning is facilitated by social networks, as per structuration theory. This study explores how informal school contacts aid learning using survey and interview data from rural school districts. The study reveals that organizational and social settings facilitate knowledge-building and sharing, creating reliable knowledge-sharing venues and informal knowledge frameworks (Karnopp, J., 2022).

1) Single-Loop and Double-Loop Learning: First put forward by Chris Argyris and Donald Schon in the late 1970s, the concept of single-loop and double-loop learning serves as a cornerstone of organizational learning theory. In double-loop learning, fundamental assumptions and values are questioned and maybe revised, unlike single-loop learning, which adjusts within already-established frameworks for better results. This contrast sheds light on the gap, within companies, between incremental progress and radical change.

2) Both the cognitive and behavioral approaches place an emphasis on the function mental processes play in the process of organizational learning. This encompasses how humans perceive new information and knowledge, process it, and integrate it into their existing knowledge base. On the other hand, behavioral approaches focus on observable acts, routines, and practices that occur within an organization. Both viewpoints help to fully comprehend how learning can take place on individual and collective levels.

3) Communities of Practice: In the early 1990s, Jean Lave and Etienne Wenger came up with the idea that learning is not just an individual activity but also a social one. This idea underpins the communities of practice theory, which states that learning is a collaborative process. People naturally tend to group into communities where they exchange information, experiences, and behaviors relevant to their shared vocations or interests. Within organizations, the distribution of information and the production of new knowledge are significantly aided by these communities' contributions.

4) Resource-Based View (RBV): The Resource-Based View, which originated in strategic management, proposes that an organization's competitive edge originates from its unique and valuable resources. This theory proposes that knowledge, as an essential resource, can be a source of sustainable competitive advantage in the framework of organizational learning. Organizations that successfully exploit their knowledge bases in a changing world can better adjust to the changes and remain resilient.

5) Organizational Memory and Sensemaking The organizational memory theory investigates how businesses store, retrieve, and use acquired information over the course of their existence. It highlights the importance of keeping detailed records of events, lessons learned, and best practices. This is supplemented by the notion of sensemaking, which Karl Weick conceived and developed. It investigates how individuals and groups make sense of complicated and ambiguous circumstances. When taken together, these theories shed light on how organizations learn from their prior experiences and navigate uncertainty.

The theoretical underpinnings of organizational learning offer frameworks that can be used to understand how organizations acquire information, how that knowledge is distributed, and how it is implemented. Researchers and practitioners can acquire a holistic understanding of how companies learn and adapt in an environment that is constantly changing if they integrate the several views that are available to them. These theories serve as helpful guides for establishing successful learning strategies and cultivating a culture of continuous improvement, both essential to modern businesses' success. Organizational learning continues to be a significant factor in determining the success of modern businesses.

IT integration in higher Education

E-learning effectiveness, self-efficacy, and motivation significantly affect strategy, while willpower and attitude indirectly affect motivation—experience with e-learning moderates effectiveness. Modern pedagogy relies on IT in Higher Education, changing teaching and learning worldwide. This literature review covers IT integration in higher Education's main issues, theoretical frameworks, problems, and best practices. E-learning self-efficacy and motivation are crucial to incorporating IT into higher Education since they affect the experience's success. The TPACK framework and the inquiry community paradigm are essential tools for integrating technology into higher Education. The TPACK framework focuses on the interaction of Technological, Pedagogical, and Content Knowledge, while the inquiry community emphasizes social, cognitive, and teaching presence in online learning settings. The Diffusion of Innovations Theory explains higher education IT adoption.

Blended learning and flipped classrooms promote individual and collaborative learning. However, challenges include the digital divide, technology resistance, and faculty training. Continual training and student-focused design can improve learning experiences. Blended learning is becoming increasingly popular, sometimes called cross-mode learning and mixed-mode learning. This pedagogical approach brings together in-person and online learning. The goal of this type of Education is to create environments that are conducive to combined and blended learning. As a result of the rapid technological advancements in information and communication technology (ICT), blended learning has recently become extremely popular. It empowers instructors all over the world to choose their preferred learning modality. As a component of this learning model, various individuals, including teachers, officers, and representatives in schools, colleges, and Higher Education, as well as governing boards and ministries, are researching the possibilities of blended learning as a method that is pedagogically sound and beneficial for increasing access to Education. As a natural consequence of the proliferation of information available on the Internet and the World Wide Web, blended learning has emerged as the most popular approach to Education in many industrialized nations. In the past two centuries, online technology has impacted Education and every other facet of human endeavor. Because of its growing popularity, blended learning has evolved over the years.

On the other hand, a significant amount of research is carried out in less developed nations, such as those in the Aasen Regions. This is becoming one of the issues since the number of students and teachers in developing countries is significantly more than in rich countries. Additionally, developing the most up-to-date software, hardware, and capabilities for electronic communications has contributed to a significantly increased rate of technological adoption in developing nations. It indicates that the emphasis of study can become more fluid, and that blended learning is constantly changing (Gaol et al.; F., 2020).

Challenges and Opportunities.

The implementation of information technology in higher Education contains a tremendous deal of potential, but it

is not without its obstacles. There may be opposition from faculty members due to differing levels of technology proficiency and trepidation toward changes in teaching approaches. This may be the case. In addition, preventing the widening of digital inequalities requires ensuring that all pupils have equal access to the available information technology tools. Nevertheless, if Foshan University is victorious in overcoming these hurdles, the institution can cultivate a culture that values innovation and ongoing Education. Empirical Studies on the Integration of Information Technology into Instruction at Foshan University: There needs to be more empirical research that specifically concerns the use of technology in the classroom at Foshan University. According to the currently available research, there appears to be an increasing understanding of the benefits of using information technology (IT) in pedagogical techniques, particularly as a response to the global movement toward remote and hybrid learning models (Wu & Zhu, 2020).

Additional research is required to have a deeper understanding of the efficiency of information technology tools in enhancing learning outcomes within the specific parameters of Foshan University. Optimal Methods and Suggested Courses of Action: Foshan University can think about implementing a phased strategy if it draws on the recognized best practices for using information technology in higher Education. This includes supplying faculty members with extensive training and assistance, ensuring everyone has equal access to information technology resources, and cultivating a collaborative learning culture by utilizing technology-enabled platforms. In addition, evaluations and feedback systems that are carried out on a consistent basis are to be put into place so that the impact of various approaches to instructing students in the field of information technology may be evaluated. After conducting research, it was found that using information technology in instructional approaches can significantly contribute to organizational learning at Foshan University. The university can improve the educational experience of its teaching staff and student body if it adopts information technology (IT) as an educational facilitator. This would position the institution as a forward-thinking hub of Higher Education in the digital age. To corroborate these findings and provide direction for future endeavors, it will be necessary to conduct additional empirical research that is suited to the particular setting of Foshan University. The process of altering learning models to meet the new demands of our hyper-connected world presents the education sector with considerable hurdles, which they must overcome to meet these new demands. Educators must deal with The most challenging task in the modern period, which is instructing students on how to interact appropriately as active and devoted citizens in our global knowledge society. In addition, the university needs to consider a student's familiarity with digital technologies in order to be able to build new educational models that are suitable for meeting the requirements of modern students. This study aims to evaluate college students' knowledge of and proficiency with digital technologies and the relationship between these factors and the student's previous academic experience. The data collection process consisted of administering a validated ad-hoc questionnaire with a total of sixteen different sections to 757 students ranging in age from 20 to 57 years old. The findings indicate that despite differences in gender and age, those students exposed to Information and Communication Technologies (ICT) throughout their secondary Education have a greater understanding of how to use these tools to their advantage during their time spent learning at the university level. This is true regardless of whether the students were male or female. In conclusion, students need to receive instruction in digital skills before enrolling in university to be prepared with greater digital competence (García et al.; J., 2020).

METHODOLOGY
Teaching Organizational Learning with IT for FOSHAN University of Higher Education, This study examined the efficacy of organizational learning via Information Technology Teaching for FOSHAN University of Higher Education, compared students' achievements before and after learning, and examined students' satisfaction with using it. The main research areas are: This project encourages higher vocational college professors to rethink teaching and learning to serve students better. As education advances, information-based methods threaten traditional ways. Higher vocational schools use information technology to improve classroom teaching more than primary Education since they are not under as much pressure to prepare students for university admission exams or future study. By observing numerous classroom teaching approaches at Foshan City higher vocational institutions. Teaching transformation in higher Education is crucial, using technology to improve learning. Active learning, blended learning, flipped classrooms, adaptive learning systems, gamification, and Edtech technologies like VR and AR improve student engagement and problem-solving. Tech-driven Education requires professional development and training. Formative assessment, digital portfolios, and learning platform analytics help personalize Education. UDL makes learning accessible and inclusive for all students, regardless of ability or disability. Information technology has updated higher education teaching to promote learning, student engagement, and accessibility. Higher education institutions can adapt to changing educational situations by supporting educators, using technology for evaluation, and prioritizing diversity. Teachers teach students how to succeed in the digital age and beyond. To serve students and the digital age, universities must invest in faculty engagement and technology. Effective technology implementation involves vision, strategic planning, and faculty support. Technology integration requires professional development and mentoring for faculty. Infrastructure and resources are necessary for smooth implementation. Effective teaching reform requires student engagement and accessibility.

Using data-driven decision-making and feedback loops, evaluate and change regularly. Nowadays, technology needs scalability and adaptability to stay relevant and practical.

IT Optimization for Higher Education Teaching Transformation: Strategy and Implementation. Educational reform in higher Education requires information technology. This requires particular methods and strategies. This essay examines optimizing IT for higher education instructional reform—custom learning platforms and content delivery: Customise learning systems for student demands and learning styles. Use adaptive assessments that adjust difficulty based on student performance for tailored feedback and challenges. Learning Analytics: Track student progress and adapt content to identify needs. Use VR and AR for immersive learning, especially in science, engineering, and history, where visualization is crucial. Create AI and machine learning-based tutoring solutions that allow real-time learning and adapt to individual paces. Blockchain Credentialing: Verify degrees and certifications safely and transparently with blockchain. Video conferencing, messaging, and file sharing with students, professors, and staff improve communication and collaboration.

Create virtual classrooms and forums for peer learning, project collaboration, and conversations. Social Learning Networks: Build online communities for students to share and learn. Accessibility, inclusivity, and UDL: Make educational resources and technology accessible to all pupils, including disabled ones. Provide deaf students with multimedia captions and transcriptions. User Testing and Feedback: Test accessibility with diverse student groups. Faculty should receive ongoing training on new technology and teaching methods. Invite experienced professors to lead technology-integrated teaching seminars. Create learning communities and support networks where academics may collaborate, share materials, and assist instructors. Scalability and Futureproofing; Flexible Infrastructure: Invest in flexible technology infrastructure to keep systems running. Feedback loops and pilot programmers Testing innovative technologies on a small scale before introduction with faculty and student input improves them. A long-term technology roadmap should align technology with the institution's instructional goals.IT optimization must be systematic and comprehensive for higher education teaching reform. Customizing learning platforms, integrating emerging technologies, enhancing communication and cooperation, emphasizing accessibility, Providing professional development, ensuring scalability, and meeting student demands can enhance learning outcomes and prepare students for digital success.

Conceptual Framework
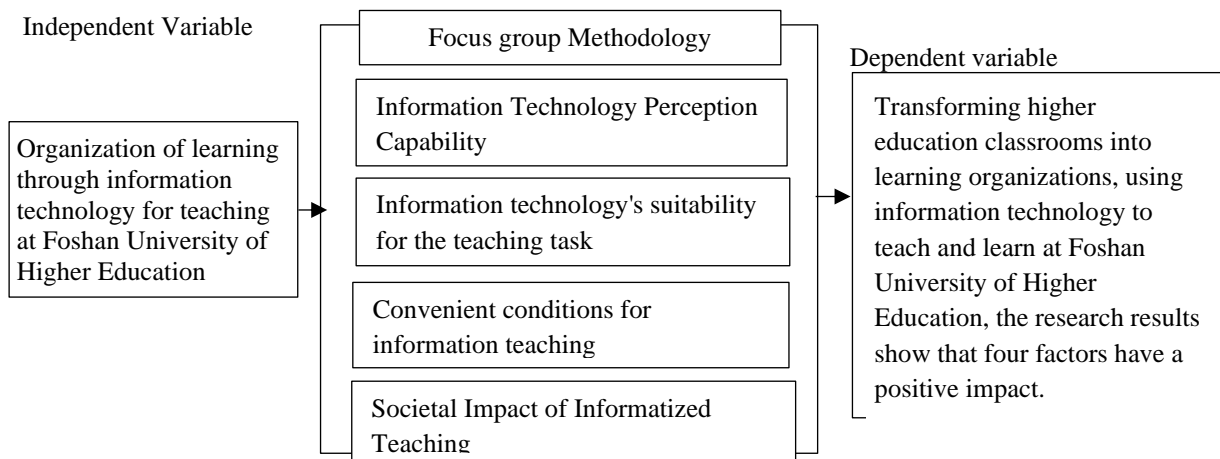
Figure 1. Conceptual Framework of the Study

Theoretical Perspective

This study will summarize and investigate higher education classroom teaching change by reviewing relevant studies. A questionnaire survey will assess college instructors' classroom teaching transformation. Higher vocational colleges and universities in Foshan will be our focus. Finally, we will perform a scientific study to assess how information technology promotes higher education teaching change. We will set variables such as instructors' impressions of information technology, their ability to use technology for teaching, and their adaptability to technology-based teaching activities. Sample and population scope. This research will assess Foshan vocational colleges and universities using simple random selection. The data collection method will distribute 370 questionnaires. We received 356 valid questionnaires and received 96.2% responses. Study samples will include this data. This study examines Foshan, Guangdong Province upper vocational college and university professors. This initiative surveys teachers' teaching and learning status concerning the IT-driven classroom transformation. The Value of Organizational Learning helps the organization adapt to changing conditions by sharing knowledge. Organizational learning allows colleges and universities to analyze, share knowledge, and

collaborate on information-age teaching methods and strategies, improving instruction and innovation.

Definition of Information Technology: Information technology encompasses a variety of tools, techniques, and applications designed to acquire, process, store, and transmit information. In the context of classroom transformation in higher Education, information technology is pivotal in integrating digital tools and resources into the teaching and learning process to foster interactivity, individualization, and collaboration.

Focus Group Methodology Implications: Focus Group Methodology is a collaborative research strategy designed to delve deeply into a specific topic through group discussion and communication. The application of the focus group methodology can facilitate the collection of diverse perspectives, experiences, and insights that lead to a deeper understanding and informed decision-making in the study "Transforming the Higher Education Classroom with Information Technology."

Transforming the Higher Education Classroom: Transforming higher education classrooms requires a departure from the traditional teacher-centered instruction and passive student reception model to a more interactive, exploratory, and collaborative approach to learning. This shift cultivates higher levels of student engagement, creativity, and problem-solving skills and better prepares students for the future demands of society.

Definition of a Learning Organization: A learning organization continuously acquires, creates, and disseminates knowledge to adapt to change and continuously innovate. In the context of classroom transformation in higher Education, a learning organization transforms into a higher education institution that actively reflects and enhances its teaching methods and readily integrates new knowledge and technology to improve teaching effectiveness and overall student quality.

Achieving meaningful student learning: Meaningful student learning is measured by students' ability to acquire more profound knowledge, develop critical thinking skills, engage in collaborative learning, and apply their knowledge to real-world problem-solving scenarios. With the transformation of higher education classrooms facilitated by information technology, students can collectively and individually achieve meaningful results in an interactive and innovative learning environment.

Significance of Foshan Higher: Foshan Higher Vocational Institution is a prime example of the practical application of information technology in classroom transformation. The study of Foshan Higher Vocational Institution provides insights into the application, effectiveness, and challenges of information technology in actual teaching and learning scenarios, providing valuable lessons and insights to other colleges and universities seeking to embark on the journey of teaching and learning transformation.

Expected Benefits: Information technology is vital in higher Education by facilitating theoretical teaching and practice and contributing to classroom teaching reform. This transformative process involves the entire teaching system, particularly the shift from a teacher-centered to a student-centered teaching structure. Through extensive case studies and data analyses, we have confirmed the enabling effect of information technology on the transformation of college classroom teaching and gained insight into how information technology promotes this transformation in higher vocational colleges and universities in Foshan City. We also analyzed the effectiveness of the current digital classroom transformation and identified challenges faced by colleges and universities in Foshan City, Guangdong Province. Based on these findings, we propose specific measures to promote the transformation of classroom teaching using information technology in higher vocational colleges and universities in Foshan City. By using education information technology, we can promote education reform in a way that aligns with the logic of education management, ultimately impacting classroom teaching and providing practical guidelines for tracking the process and impact of education change.

Research Design
1) Research assumptions
This study aims to explore in depth the contributing factors of information technology in the transformation of university teaching. Based on existing literature and theories, we have identified four factors that significantly affect the promotion of information technology in the transformation of university classroom teaching, which are formulated as research hypotheses:

Hypothesis 1 (H1): The technological perception ability of university teachers positively and significantly influences the transformation of university classroom teaching. Using the Technology Acceptance Model (TAM), we derive perceived usefulness and ease of use as factors of technology acceptability. We hypothesize that university teachers' higher technological perceptual capacity correlates with an increased likelihood of acceptance and use of information technology, thus promoting innovation and transformation of university classroom

teaching.

Hypothesis 2 (H2): The compatibility of information technology with teaching tasks positively impacts the transformation of university teaching. According to the Task-Technology Fit (TTF) model, we consider technology-task compatibility as one of the influencing factors. We postulate that the greater the compatibility between information technology and teaching tasks, the greater the inclination of teachers to implement information technology in teaching, ultimately promoting the development and informatization of university teaching.

Hypothesis 3 (H3): The convenience of information technology in teaching significantly and positively promotes the transformation of university classroom teaching. Based on the Unified Theory of Acceptance and Use of Technology (UTAUT) model, we consider convenience conditions as one of the influencing factors. More convenient conditions for using information technology will enhance the application and use of information technology and multimedia technology in the classroom, inevitably leading to the transformation and advancement of university classroom teaching.

Hypothesis 4 (H4): The Social Impact of information technology in teaching positively impacts the transformation of university classroom teaching. Higher levels of social impact of information technology in the teaching environment lead to a more comprehensive and impactful transformation of university classroom teaching. We hypothesize that the more significant the social impact of information technology on the university teaching environment, the more it will facilitate the implementation of informatization in university teaching.

Through in-depth research and empirical analysis of the above research hypotheses, we aim to provide strong theoretical support and practical experience for the integration of information technology in transforming university teaching. In addition, we aspire to provide valuable insight and guidance for the reform and development of higher education teaching. We will strictly adhere to academic norms throughout the research process to ensure objectivity and accuracy. We aim to provide valuable recommendations and insights for educational practice and policymaking.

2) Variable selection

Latent Variable	connotation	Observed Variable
Information Technology Perception Capability of University Teachers	Teachers' Perceived Usefulness and Ease of Use of Information New Technologies	The extent to which teachers believe that the application of information technology in teaching will improve teaching effectiveness (X1)
		Teachers' perceived ease of use of information technology in the teaching process (X2)
Fit Between Information Technology and Teaching Tasks	Teachers' perceived match between information technology and current teaching	Teachers' perceived ease of use of information technology during the use process (X3)
		Teachers' perceived consistency between information technology and individual teaching needs (X4)
		Teachers perceived relative advantages of using information technology in teaching compared to traditional teaching in terms of functionality (X5)
Facilitating Conditions for Enhanced Information Technology Education	Teachers' perceived ease of using information technology and implementing classroom transformation	Degree of Openness of School Network Information Resources (X6)
		Adequacy of information teaching equipment in schools (X7)
		The degree of policy incentives provided by the school for teachers to implement information technology-enhanced teaching (X8)
Social Impact of Information technology-enhanced Education	The influence of social environment on teachers' information technology-enhanced teaching	Number of colleagues implementing information technology-enhanced Education (X9)
		Teachers' acceptance of information technology-enhanced teaching in schools (X10)
		Information technology-enhanced teaching environment in schools (X11)

3) This study focuses on how information technology transforms university teaching and employs various research approaches to implement the study design effectively. The primary research methods used in this study include a

literature analysis approach that tracks international and domestic literature on university teaching transformation, educational informatization, and integration. We ensure our research is authoritative and cutting-edge by methodically evaluating and comprehensively analyzing many academic papers, research reports, policy documents, etc. Our research is based on a theory that explores the role of information technology in teaching at the university level. To conduct the study, we used a two-stage questionnaire. The first survey examined vocational skills-based training in Foshan higher vocational colleges, while the second poll focused on blended learning classrooms that used information technology. The study aimed to understand instructors' and students' views on how information technology can transform instruction in the classroom.

Observation is crucial in theoretical inquiry, so we conducted in-depth interviews and close observation of diverse classrooms to explore how information technology transforms university teaching. Through this method, we discovered implicit, dynamic, and ambiguous issues that theoretical research cannot reveal. Observation offers direct insights and reflections on transformation issues, providing colorful and exciting material for further research.

Our study follows a case study methodology and examines typical examples of how information technology transforms university education. These examples include "micro-assistant teaching," flipped classrooms, and intelligent classroom environments for synchronous instruction. By analyzing these examples, we demonstrate how information technology can be used in diverse classrooms and how it transforms instruction. Study subjects and sampling: This study includes Foshan upper vocational college teachers. Our research examines their information technology views, applications, and attitudes to improve classroom instruction. Using simple random sampling, we selected a research sample from Foshan upper vocational college teachers. To verify data dependability, we employed a questionnaire survey. The response rate was 96.2% on 370 questionnaires. We analyze and discuss these legitimate questionnaire data in this study. By statistically analyzing this sample data, we hope to learn about teachers' views on how information technology is changing classroom instruction and how they use it. The research's conclusions and recommendations will depend on these data to fully comprehend how information technology has changed university teaching.

4) Research Tools: We will utilize the CIPP (Context, Input, Process, and Product) model to assess student satisfaction with educational management information system construction at higher vocational colleges. Design, investment, and process management of educational management information systems affect student satisfaction at higher vocational colleges. The results of constructing education management information systems will determine student satisfaction. The Technology Acceptance paradigm (TAM) is a popular theoretical paradigm for technology adoption. This study will use TAM to assess teachers' embrace of information technology to transform instruction. Usefulness, convenience of use, and attitude are vital considerations. We aim to understand how information technology transforms university teaching by investigating teachers' perspectives, attitudes, and readiness to integrate it into instruction. The Task-Technology Fit Model (TTF) shows how IT supports work tasks and meets task needs. This research will examine how information technology transforms university education by matching information technology to university teaching tasks. To understand how information technology affects teaching performance, we shall investigate its compatibility with instructional tasks. Tools Application: This study will use TAM and TTF models to assess information technology's role in university teaching transformation. Promote the transformation of university teaching by examining university teachers' perceptions of information technology capabilities, the fit between information technology and teaching tasks, the convenience of IT-enhanced teaching conditions, and the social implications. To interpret the results, we will utilize 11 indicators, such as "the extent to which teachers believe that the use of information technology in education will improve teaching effectiveness."

5) Evaluation of content and questionnaire reliability. We analyzed questionnaire reliability in this study to assure data reliability and consistency. Cronbach alpha assessment on the 11 observable variables showed that the questionnaire's total Cronbach alpha was 0.952, indicating strong reliability and internal consistency. We tested four sub-sections separately for reliability. The first, second, third, and fourth subsections had Cronbach alphas of 0.876, 0.938, 0.863, and 0.987. All four subgroups had Cronbach alpha values above 0.7, indicating excellent reliability and internal consistency between observed variables—test questionnaire validity. To validate the questionnaire, we used AMOS software to do a confirmatory factor analysis. We tested the four subgroups' convergent and discriminant validity. In the convergent validity test, all observed variable factor loadings were more than 0.7, suggesting good explanatory power and a satisfactory explanation of latent variables. In the composite reliability test, all four subsections had CRs greater than 0.7 and AVEs greater than 0.5. Our discriminant validity test showed that the correlation coefficients between the constructs were all less than the square root of the AVE for the corresponding latent variables. This demonstrates convergent solid validity and discriminant questionnaire constructs.

6) Three parts comprise data analysis: Part I tests the conceptual model of information technology for college and university classroom teaching transformation against real data. Part II examines the structural equation model for higher education information technology for teaching transformation, its causes, and its future. This stage estimates and evaluates model variables to determine their relationship and function. Information technology's four university teachers' assessed competency, appropriateness of technology and instructional assignments, facilitating environments, and society have direct effects. Part III applies empirical analysis from the first two parts to test the four study hypotheses. The researchers will use statistical tests and hypotheses to assess how university professors' perceived IT ability, IT and teaching tasks, IT teaching supporting conditions, and the IT teaching society affect university teaching transformation. This chapter uses qualitative and quantitative research approaches. Qualitative fieldwork and interviews with Foshan Higher Vocational College teaching staff explored how information technology transforms university teaching and gathered relevant information. This quantitative study used 370 questionnaires issued to Foshan Vocational College professors and 356 valid questionnaires gathered, yielding a 96.2% response rate. We also designed and analyzed a conceptual model for transforming university education through information technology. Estimating the structural equation model will reveal the links and pathways between information technology-enabled university teaching transformation and its affecting elements. The focus will be on four dimensions: university teachers' IT perception skills, the alignment between IT and teaching tasks, the convenience of IT-supported teaching conditions, and the social implications of IT-supported teaching, focusing on their direct impact on university teaching transformation. Finally, the research hypotheses will be examined, and a qualitative and quantitative analysis of supporting university teaching transformation using information technology will be done. This chapter's research methods and data analysis establish the groundwork for further examination of information technology's involvement in university teaching transformation.

This study analyses data with SPSS 22.0 and AMOS 17.0. First, SPSS 20.0 will briefly describe and statistically analyze Foshan higher vocational colleges and universities' information technology teaching capabilities and its impacting elements. After a preliminary correlation analysis of teachers' information-based teaching abilities and their influencing elements, AMOS 17.0 analyses the structural model of effective classroom transformation into information-based teaching. This study also analyses the mechanisms that transform effective classroom information-based teaching and the relationship between information technology, educational task adaptability, information-based teaching convenience conditions, and the societal impact of information-based teaching. (1) Sample demographics. This study is questionnaire-based. Designing the teachers' information-based teaching ability scale mainly uses the "National Guide to Teachers' Educational Technology Ability in Colleges and Universities" and existing research scales at home and abroad to modify and improve them. This study uses Likert 5-point scales to quantify influencing factors using maturely utilized scale questions in relevant literature at home and abroad. This study uses data from "Investigation and Research on Informatization Teaching Ability and Influencing Factors of College Teachers." Questionnaire stars created and distributed online questionnaires. The questionnaire samples came from 4 Foshan higher vocational colleges. Finally, 356 genuine surveys arrived. The sample data is in Table 4-1.

Table 1: Basic information of study subjects

(n=356)

Demographic variables	Category	Frequency	Effective percentage (%)
Gender	Male	116	32.6%
	Female	240	67.4%
Age	20~30 years old	34	9.6%
	30~40 years old	143	40.2%
	40~50 years old	108	30.3%
	50~60 years old	68	19.1%
	Over 60 years old	3	0.8%
Teaching age	1~5 years	82	23.1
	6~10 years	51	14.3
	11~15 years	61	17.1
	16~20 years	51	14.3
	More than 20 years	111	31.2
Education	Undergraduate	94	26.4%
	Graduate student	210	59%
	PhD	52	14.6%
Professional title	Lecturer	166	46.6%
	Associate Professor	147	41.3%

	Professor	43	12.1%
School	Shunde Polytechnic	89	25%
	Foshan Polytechnic	90	25.3%
	Guangdong Polytechnic	76	21.3%
	Guangdong Polytechnic of Environmental Protection Engineering	101	28.4%
Category of subjects taught	Humanities	115	32.3%
	Social Sciences	170	47.8%
	Science and Engineering	70	19.6%
	Agriculture and forestry	1	0.3%

The table shows that female survey participants outnumbered males by almost 30%. Most teachers in the poll were 30-40 (40.2%) and 40-50 (30.3%). Following them were 50-60-year-olds and 20-30-year-olds, with 0.8% of teachers over 60. The survey found 59% of teachers had postgraduate degrees and 14.6% had doctorates. The poll had 46.6% lecturers, 41.3% associate professors, and the lowest professors. With 28.4% of teachers, Guangdong Vocational College of Environmental Protection Engineering outnumbered its 21.3% counterpart. There were 47.8% social science teachers, 32.3% humanities, 19.6% science and technology, and 0.3% agriculture and forestry. This research gives accurate and valid data for practical research and analysis due to the number of samples and demographics. (1) Independent Variable Definition and Measurement: Before establishing the structural equation model, the independent variables' measurement indicators and question setting must be clarified, and each measurement index must be set under the definition dimension of the independent variables. Latent variables in this study include technical perception skill, internal motivation, technology and task adaption, convenience conditions, enabling conditions, and social influence. Every hidden variable has 2–3 observation variables that answer measurement questions. For variable definitions and measurements, see Table 2.

Table 2: Independent variable measurements and definitions

Latent Variable	connotation	Observed Variable
Information Technology Perception Capability of University Teachers	Teachers' Perceived Usefulness and Ease of Use of Information New Technologies	The extent to which teachers believe that the application of information technology in teaching will improve teaching effectiveness (X1)
		Teachers' perceived ease of use of information technology in the teaching process (X2)
Fit Between Information Technology and Teaching Tasks	Teachers' perceived match between information technology and current teaching	Teachers' perceived ease of use of information technology during the use process (X3)
		Teachers' perceived consistency between information technology and individual teaching needs (X4)
		Teachers' perceived relative advantages of using information technology in teaching compared to traditional teaching in terms of functionality (X5)
Facilitating Conditions for Enhanced Information Technology Education	Teachers' perceived ease of using information technology and implementing classroom transformation	Degree of Openness of School Network Information Resources (X6)
		Adequacy of information teaching equipment in schools (X7)
		The degree of policy incentives provided by the school for teachers to implement information technology-enhanced teaching (X8)
Social Impact of Information technology-enhanced Education	The influence of social environment on teachers' information technology-enhanced teaching	Number of colleagues implementing information technology-enhanced Education (X9)
		Teachers' acceptance of information technology-enhanced teaching in schools (X10)
		Information technology-enhanced teaching environment in schools (X11)

Define and measure the dependent variable: The dependent variable of this study is college professors' information-based teaching capacity. This capacity comprises adopting information-based tools, designing teaching, building resources, and implementing it. Test college instructors' information-based teaching capacity using the "National Guide to Teachers' Educational Technical Capacity in Colleges and Universities" evaluation scales and five measurement indicators. The design method required ten measuring items, two for each index. Refer to Table 3 for detailed measurement definitions and methods.

Table 3: Dependent variable definition and measurement

Variable	Secondary indicators	Measured indicators	Definition
Classroom teaching transformation information teaching ability	Ability to adapt information tools	Ability to adapt information tools 1	Proficient in using software to make micro-lessons, pictures, videos, animations, etc.
	Ability to adapt information tools	Ability to adapt information tools 2	Ability to use network platforms and information tools for teaching
	Information resource building capacity	Information resource building capacity 1	Ability to produce and process digital educational resources that effectively support classroom instruction
	Information resource building capacity	Information resource building capacity 2	Ability to use information resources to develop online courses or to teach resource libraries in an information environment
	Informatization teaching design ability	Informatization teaching design ability 1	Develop appropriate teaching objectives and design information-based teaching processes.
	Informatization teaching design ability	Informatization teaching design ability 2	Ability to design and build a student-centered learning environment that fosters student collaboration, communication, and interaction
	Information teaching implementation ability	Information teaching implementation ability 1	Ability to implement information technology teaching modes and methods in different environments
	Information teaching implementation ability	Information teaching implementation ability 2	Technical tools can be used to manage and monitor the teaching process effectively and promptly identify and resolve problems encountered in teaching.

Questionnaire reliability and validity tests; reliability analysis. In scientific data analysis, questionnaire reliability matters. It verifies data and findings. This study examined questionnaire reliability with Cronbach's Alpha. Higher coefficients improve questionnaire reliability. Table 4 reveals that each Cronbach alpha potential variable was greater than 0.8, meeting the baseline of 0.7 or above, confirming survey questionnaire reliability.

Table 4: Dependent variable definition and measurement

Variable	Secondary indicators	Measured indicators	Definition
Classroom teaching transformation information teaching ability	Ability to adapt information tools	Ability to adapt information tools 1	Proficient in using software to make micro-lessons, pictures, videos, animations, etc.
	Ability to adapt information tools	Ability to adapt information tools 2	Ability to use network platforms and information tools for teaching
	Information resource building capacity	Information resource building capacity 1	Ability to produce and process digital educational resources that effectively support classroom instruction
	Information resource building capacity	Information resource building capacity 2	Ability to use information resources to develop online courses or to teach resource libraries in an information environment
	Informatization teaching design ability	Informatization teaching design ability 1	Develop appropriate teaching objectives and design information-based teaching processes.
	Informatization teaching design ability	Informatization teaching design ability 2	Ability to design and build a student-centered learning environment that fosters student collaboration, communication, and interaction
	Information teaching implementation	Information teaching implementation	Ability to implement information technology teaching modes and methods in different

	ability	ability 1	environments
	Information teaching implementation ability	Information teaching implementation ability 2	In order to manage and monitor the teaching process effectively, technical tools can be utilized. These tools can also help promptly identify and resolve any problems encountered during teaching

Additionally, the reliability and validity of questionnaires can be evaluated through reliability analysis. It is important to note that the reliability test of a questionnaire is its primary purpose, as the consistency and authenticity of scientific data interpretation depend on it. This study used Cronbach's Alpha to assess questionnaire reliability. A higher coefficient suggests a more reliable questionnaire. The study's questionnaire was reliable because every Cronbach alpha potential variable was larger than 0.8 in Table 4, meeting the baseline threshold of 0.7 or above.

Table 5: Validity test results for each variable

Latent variable	Observed variable	Ingredient						
		1	2	3	4	5	6	7
Information Technology Perception Capability of University Teachers	Perceptually easy to use							0.859
	Perceptually useful							0.848
Fit Between Information Technology and Teaching Tasks	Comparative advantage		0.793					
	Convenience		0.780					
	Degree of compatibility		0.795					
Facilitating Conditions for Enhanced Information Technology Education	Platform construction					0.766		
	Sufficient resources					0.765		
	Hardware equipment					0.797		
Social Impact of Information technology-enhanced Education	Group participation				0.739			
	Group identity				0.793			
	Group atmosphere				0.785			
Classroom teaching transformation information teaching ability	Tool adoption 1	0.743						
	Tool adoption 2	0.732						
	Resource construction 1	0.753						
	Resource construction 2	0.718						
	Instructional Design 1	0.668						
	Instructional Design 2	0.736						
	Teaching implementation 1	0.687						
	Teaching implementation 2	0.747						
Eigenvalue		10.915	2.262	1.706	1.249	1.228	1.118	1.062
Explain		23.854%	33.502%	43.038%	52.221%	61.115%	68.289%	75.150%
KMO	0.910							
Inspection of Bartlett's test	6295.791（p=0.000）							

Questionnaire: Analyzing a scale's structural validity and latent variable consistency is typical. This study tests validity and dimension component stability with SPSS.21. Exploratory factor analysis is in Tables 4-5. The factor analysis-compliant KMO value of 0.910 exceeds 0.70. Factor analysis is possible since Bartlett's sphericity test 6295.791 and p-value of 0.00 reveal a substantial correlation between variables. The principal component analysis found seven similar factors with eigenvalues >1, resulting in a 75.150% rotated square sum. Orthogonal rotation divided the 20 question alternatives into seven factors with load values over 0.5, indicating that the extracted factors are comprehensive and have no overlapping high-factor loadings. Based on theoretical assumptions, observable variables were aggregated in each dimension. The selected scale has been previously evaluated and is considered structurally valid and suitable for analysis. The research was conducted using Path Analysis and Structural Equation Construction, with correlation analysis carried out using Amos' structural equation model. The findings indicate a strong correlation (p < 0.05) between technological perception, task adaptability, convenience, social impact, and knowledge transfer in college classroom instruction. Next, assess the model using fitting indicators to see if the structural equation model is applicable. Improvement is needed in pre-model fitting. The updated model standard increases the co-variability between the four latent variables: technology perception ability, technology and task adaptability, convenience circumstances, and social effect and observation variables e26 and e18's error variance. Corrected model fitting indications are in Table 6.

Table 6: Modified Model Fitting Indicators

Reference index	χ^2/df	RMR	GFI	AGFI	NFI	IF	TAG	CFI	RMSEA
Statistical value	2.093	0.0393	0.892	0.863	0.910	0.951	0.942	0.951	0.055
Reference value	<3	<0.05	>0.8	>0.8	>0.9	>0.9	>0.9	>0.9	<0.08
The standard situation	Reach the standard	Reach the standard	Reach the standard	Reach the standard	Reach the standard	Reach the standard	Reach the standard	Reach the standard	Reach the standard

The enhanced model demonstrates adherence to the standard of Structural Equation Modelling, hence enabling the utilization of path coefficient analysis. Table 7, generated by the AMOS software, will display the path coefficients of latent variables that impact the ability to teach based on knowledge. The table will help examine and clarify the influence of these factors. According to instructors, practicality and applicability are the top priorities regarding information technology. The results of the Structural Equation Model analysis indicate a statistically significant positive relationship between the technology perception capacity of college professors and their ability to engage in information-based teaching (t value = 4.035, p = 0.000 < 0.01). The enhanced capacity of individuals to perceive higher levels of information technology facilitates the transformation of classroom teaching into instruction centered around the utilization of information. They are providing evidence in favor of hypothesis H1.

Additionally, the findings of the Structural Equation Model indicate a statistically significant positive association between information technology and the adaptation of teaching tasks, as well as the transformation of classroom teaching into the ability to deliver instruction based on information (t value = 2.415, p = 0.0016 < 0.01). The hypothesis H2 is supported. Furthermore, the comfort factor associated with information-based teaching pertains to teachers' ability to utilize and implement technology effortlessly. Teachers need access to sufficient information resources and support for classroom equipment to become skilled in using information-based teaching methods. Convenience circumstances have the highest effect coefficient and significant level among the essential elements, with a path coefficient of 0.260 (t value = 3.888, p = 0.000 < 0.001). As convenience conditions improve, shifting from traditional classroom teaching to information-based teaching becomes more accessible and seamless. This positive relationship between convenience conditions and the transition to information-based teaching supports hypothesis H3. The social impact of information-based teaching is related to how much the collective environment of information-based teaching affects the adoption of information-based instructional methods in higher education institutions. The results of the path coefficient analysis indicate a statistically significant positive association between the social impact of information-based teaching and the ability of classroom teaching to transition into it (t value = 2.038, p = 0.042 < 0.05). This finding provides support for hypothesis H4. Technology integration into higher Education is significantly transforming, driven by several influential variables. These elements include educators' capacity to comprehend and effectively utilize information technology, the extent to which technology is adapted to meet specific educational objectives, the convenience afforded by technology-based teaching methods, and the social implications associated with its implementation. To enhance the quality of instruction, educators should enhance their knowledge and understanding of information technology, actively cultivate their theoretical and practical understanding of information-based teaching, and participate in training programs focused on information-based pedagogy. Enhancing confidence in information-based instruction can elevate the quality and efficacy of Education. In today's world, where information is abundant, promoting innovation in IT and encouraging educational collaboration is crucial. Higher education institutions need to utilize their information resources and provide a practical instructional platform that caters to the unique characteristics of different disciplines while aligning with overarching development objectives. The use of online learning platforms and

interactive features has the potential to enhance digitized instruction and optimize the utilization of resources.

CONCLUSIONS, DISCUSSION AND RECOMMENDATIONS

This study's primary objective is to comprehensively examine classroom teaching methods employed in higher education institutions across Foshan City. The purpose is to gain a deep understanding of the merits and limitations associated with each instructional style. Additionally, this research endeavor will leverage information technology to facilitate practical investigations. Through the proactive promotion of integrating information technology-based instructional strategies, we aim to enhance the educational process by facilitating a more immediate and intuitive learning experience for educators and learners alike. Furthermore, we seek to effectively instill a more profound recognition of the enhanced educational merits associated with these pedagogical approaches. The overarching objective is to facilitate a profound transformation in worldwide perspectives and methodologies about Education. The objective of this study is to get a comprehensive understanding of the evolution of teaching methods in colleges and universities by thoroughly analyzing their distinctive characteristics, development history, and diverse approaches employed. This study investigates the impact of implementing revised classroom teaching modes in higher vocational colleges and universities in Foshan City. By incorporating feedback obtained during the implementation process, we aim to examine potential changes in teaching methods employed by educators, shifts in learning habits among students, and broader trends in the future development of the teaching ecology.

Conclusions

This study explores the relationship between teachers' proficiency in information-based teaching, their perception of information technology, their adaptation to teaching tasks, the ease of access to information-based teaching resources, and the social impact of information-based teaching on effective classroom transformation. A questionnaire survey was conducted from higher vocational colleges in Foshan. The findings revealed four factors that positively impact teachers' information-based teaching skills: ease of accessing resources, perception of information technology, adaptation of information technology to tasks, and social impact of information-based teaching. To promote successful implementation, teachers should optimize their knowledge structure, enhance their perception of information technology, promote innovation, encourage collaborative evolution, improve the information resource environment, and establish an information-based teaching platform.

Discussion

While this study has yielded preliminary conclusions based on empirical research, it is important to acknowledge several limitations that necessitate additional refinement in future investigations. Regarding the sampling procedure, it is essential to note that this study did not adhere strictly to the stratified sampling approach during the administration of the questionnaire survey. This deviation might be attributed to limitations in funds and available human resources. Consequently, there could be an unequal dispersion of specific demographic factors among the sample, potentially impacting the sample's representativeness. In order to obtain more universally applicable findings, it is advised that upcoming research endeavors consider increasing their sample size.

Additionally, it should be highlighted that this study solely utilized a horizontal design and did not integrate a longitudinal follow-up survey. In this context, using cross-sectional data must be improved to establish causal correlations. In population biology, integral projection models (IPMs) and matrix models have significantly impacted conceptualizing demographic models. IPMs represent demographic processes as continuous functions of state variables, making them more statistically efficient and accurate than traditional matrix models. This study evaluates the differences between IPMs and matrix models and their impact on estimating key model outputs, such as population growth rates, sensitivity patterns, and life spans. Results show that empirical sample sizes generally matter more than the modeling approach for the accuracy of demographic outputs (Doak et al.; M., 2021). To further our understanding of the interplay among different variables, it is recommended that the following studies concentrate on students' evaluations of their instructors' aptitude in incorporating technology within the educational setting and their capacity to facilitate in-depth debates and analyses.

Recommendations

The study emphasizes the importance of fostering a comprehensive understanding of information-based teaching in college education. It recommends that educators adopt a more inclusive perspective and continuously improve their understanding of subject-specific instructional technology. Institutions should establish conditions conducive to teacher development by offering comprehensive training programs focused on information technology instruction. The Teacher Education Development Centre and the Modern Education Technology Centre are recommended. The objective is to create an interconnected system involving multiple departments, such as these institutions, to establish a consistent and enduring training system for teachers in information technology. Research should be conducted to assess teachers' instructional competencies and the demand for such skills. The study explores the design approach of a professional development program for adult education teachers, focusing on technology integration. The design approach emphasizes the importance of aligning information with teachers' specific needs, allowing them to design technology-enhanced learning artifacts and selecting appropriate ICT tools

for adult learning (Alemdag et al.; E., 2020). Training courses will be developed to align with the information-based teaching environment prevalent in schools, promoting a collaborative mindset, staying updated with professional knowledge, and stimulating enthusiasm for continuous learning. A comprehensive framework will be implemented to train teachers in information-based teaching practices, including a communication platform and various teaching research activities. Institutions should also cultivate a collective vision of information technology education among their academic members, enabling them to collaborate and exchange ideas about IT education within university standards. This interaction fosters a collective atmosphere of assistance and collaboration, facilitating the development of common principles and cultural standards. Instructional design competitions and regular academic exchange initiatives are recommended to promote the advancement of educational capabilities in the realm of information technology.

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Perception Management of Newspapers: Evaluation of the Relationship Between Digital Media and Education

Sinan ŞEMİLER
Ph.D. Student, Girne American University, Faculty of Communication, Department of Press and Broadcasting, Kyrenia/ TRNC.
Email: sinansemiler@gau.edu.tr

Nariman SAYGILI
Prof. Dr. Girne American University, Faculty of Communication, Department of Press and Broadcasting, Kyrenia/ TRNC.
E-mail: nerimansaygılı@gau.edu.tr
Orcid: 0000-0002-5809-1828.

Abstract
Media literacy is an essential area of discussion with its digital competencies and skills, the online opportunities it provides, and the risks it carries. The mobilization of today's media tools, the ability to connect to the network through smartphones regardless of time and place, and easy accessibility have brought new media tools to the centre of our lives. The speed and change in new communication technologies present new opportunities and risks, especially for children and young people. Today, the new media environment and tools have a social role in determining, transforming, shaping and giving new forms to social relations. Communication relationships, online behaviours and attitudes realized by technology are the subjects of many studies. Being constantly networked or connected is essential in young people's social identity construction and carries many risks. The individual who needs to be media literate in the face of traditional media has to be much more conscious and educated in the face of multi-media channels and productions that are renewed and changed with today's digital developments. In this context, structural changes and transformations in information and communication technologies have made it necessary to discuss new media literacy and new literacy skills, online opportunities and risks. As a result of the conceptual discussion, it has been revealed that individuals who have the digital competencies and skills of the 21st century, who can use online opportunities at the maximum level, who are aware of online risks and can minimize them, should be trained with new media literacy education.
Keywords: Communication, media, local media, media literacy.

Introduction
In 1878, the modern history of Cyprus began with the lease of the island of Cyprus by the Ottoman Empire to the British Empire and the de facto annexation of the island of Cyprus by Britain at the end of World War I. As a result of the 1959 London and 1960 Zurich Agreements, the Republic of Cyprus was established on the island of Cyprus in partnership with Greek and Turkish Cypriots under the legal guarantor of Britain, Turkey and Greece. With the beginning of the intercommunal conflicts in 1963, the two communities, which were forced to live in separate regions, with the support of Greek and Greek fanatical nationalists, overthrew the elected President of the Republic of Cyprus, Makarios, in 1974, as a result of the events that developed, Turkey landed troops on the island based on the 1960 Treaty of Guarantee and took approximately 40% of the island under its control. Shortly after the landing of the Turkish troops on the island, the Turkish Cypriots began to govern themselves by establishing the Autonomous Turkish Cypriot Administration on October 1 1974, the Turkish Cypriot Federated State on February 13, 1975, and the Turkish Republic of Northern Cyprus on November 15 1983, exercising their right to self-determination.

Article 99 of the 1985 TRNC Constitution stipulates that presidential elections must be held every five years (TRNC Constitution, 2009). In the first elections held on November 15, 1983, Rauf R. Denktaş was elected as the first President of the TRNC. Rauf Denktaş, who did not trust the federal solution based on the partnership between the Greeks and the Turks and believed in the independence and sovereignty of the TRNC, won the re-elections in 1990, 1995 and 2000 and served as the President for three terms.

The recognition of the President of the TRNC as the representative of the Turkish Cypriot community in the international community and the fact that he is the only accepted representative of the Turkish Cypriot community in the Cyprus settlement negotiations, reveals the importance of the Presidency, especially in international relations. "Another factor that ensures that the President is in a strong position is that the President has the title of leader of the Turkish Cypriots, and this title is often confirmed by the decisions taken by the Assembly of the Republic (Bozkurt, 2014)." Although there is no direct duty given to the President in the Constitution within the scope of the Cyprus peace negotiations, there is an established tradition that the President of the Republic conducts

the negotiations as the "leader of the Turkish Cypriots". Therefore, it can be concluded that the President has undertaken an essential task in the context of the Cyprus issue (Ustabulut, 2020)."

Since 1964, the Republic of Cyprus, represented by the Greek Cypriots, has made Exclusive Economic Zone agreements with other countries in the Eastern Mediterranean and started natural gas exploration studies, which changed the policies followed in the region. In this severe crisis, in which regional powers and especially international powers such as the United States, Russia, France and Italy, which have essential interests in the region, are involved, the only internationally accepted factor that strengthens Turkey's hand other than the length of the coast is its rights in the context of the guarantor of the Republic of Cyprus, arising from the 1959 Zurich and 1960 London Agreements. Therefore, dominating the island of Cyprus has been important for Turkey's Eastern Mediterranean policy. When we consider that dominating the island of Cyprus requires having a say over the Turkish Republic of Northern Cyprus, the importance of the last TRNC Presidential elections emerges.

The Language of Headlines and Education
Language is a structure that matured in the periods before the formation of writing, equipped with all kinds of bodily and environmental movements, includes silent and verbal communication forms, and means much more than writing (Çelik, 2018). Language, the most critical communication tool of human beings, is one of the most essential elements that provide social development and regulate human relations. According to Muharrem Ergin (1980), language is "a natural tool that enables agreement between people, a living entity that has its laws and develops only within the framework of these laws, a system of secret agreements whose foundations were laid in unknown times, a social institution woven from sounds." Language is the most effective means of communication for people living in groups. Without language, it is very primitive for people to communicate. With this primitive communication, society cannot develop and grow. Language serves many purposes, enabling the individual to express his thoughts, convey information, share, understand, evaluate and clarify events. Language, which can determine what is thought and seen, plays a vital role in transferring the civilization and culture created by man to new generations. "The other important function of language is to hold the nation and society together. Language emerges as a tool that enables the transition of the culture that shapes the nation and gives it personality from historical times to today and today to tomorrow (İpek, 2015)."

Language, one of the most influential forces used by politicians to influence, manipulate and direct target audiences, is conveyed to society in a political language that serves the purpose of politicians. "Politicians, whose aim is to influence the target audiences, often resort to rhetorical expressions. Aristotle defines rhetoric as follows: It is the ability to use the means of persuasion that are available in a given situation. Political rhetoric: Politically motivated speeches made by politicians (Aristotle, 1995; Aziz, 2019). Politicians aim to change or direct the target audience's behaviour through rhetorical statements. Instead of detailed, precise statements, politicians interpret the events known to the masses so that they understand and give them the messages they want without tiring the audience. The language used by politicians must be persuasive, carefully selected and simple for the issues that the public can understand, that the public is aware of and that it creates a change in attitude and behaviour in the target audience.

The basis of the Turkish Cypriot Press in the TRNC is the print media (Kalkan, Şafaklı and Günalp, 2015). The indicators used in newspaper news and the signifier-signifier relations that make up these indicators will be determined, and the codings used in their arrangement will be examined. Semiotic analysis deals with the meaning contained within texts; in other words, 'meaning consists of signs' and intersemiotic relations (Seyide and Parsa, 2004). By analyzing the headlines and subheadline news of Cyprus, the largest left-wing party, the Republican Turkish Party's publication, Yenidüzen, the publication organ of the ruling conservative right-wing party, the National Unity Party, the influential ideological newspapers, the nationalist and conservative Volkan, and the European newspapers representing radical leftist views, the political messages that the presidential candidates Ersin Tatar and Mustafa Akıncı aim to convey to the voters in the local press are determined, The language and codes used in these messages will be analyzed, and the effect of print media on voters will be investigated. Yenidüzen newspaper is a party publication directly linked to the CTP. Güneş newspaper is the official organ of the ruling UBP. Newspapers not affiliated with political parties clearly show their ideology compared to others: Africa, Volcano ... (Kalkan, Şafaklı and Günalp, 2015).

Political Communication and Digital Learning Environments
Political communication has many definitions because it covers all economic, cultural, social and economic issues with a broad and complex concept. Despite all this complexity and difficulty, "political communication" is simplified. It can be defined as "the use of various types and techniques of communication by political actors to impose certain ideological tools and policies on certain groups, masses, countries or blocs, and to transform them into action and put them into practice when necessary" (Aziz, 2019). Although political communication is

multifaceted, it is generally perceived as electoral communication. Political communication covers not only the election period but also the period outside the election. It is necessary to consider the dimensions of political communication as a political campaign, election period and non-election time (Öztuğ, 2004).

Language is the most critical element that establishes people's connection with society and enables them to communicate within society. Language is the most essential tool used when the messages from politicians to the public are built on building thought (Durgun and Yaman, 2017). Without language, life is straightforward and primitive. French philosopher Roland Barthes' definition of ideology as how the ruling class shaped social reality in the 1960s and questioning media discourses put a different view in the study of texts. The role of mass media in the realization of political communication is vital. Politicians give ideological direction to society by using language and realizing political communication through mass media. Politicians or political campaign consultants dictate the language used to manipulate, change, or manipulate society. Once the ideological language jargon is determined, it is sent to the target audience through various forms of communication (Kılıçaslan, 2008). Political language, which creates a link between the rulers and the society, uses the characteristics of language to influence, direct, manipulate and educate the target audience and society The individual's words, facial expressions, tone of voice, statements, jokes, gestures, clothing and clothing strengthen the political language.

When the linguistic features used in political communication are examined, it is seen that personal pronouns are frequently used. They address the masses in a language that the public can understand, using folk idioms and proverbs. Using personal pronouns such as I, we, he, them, supporters and opponents are distinguished. Using the rhymes, redifs and assonance of the language ensures that the discourses sound more effective and pleasing. It is frequently used in political language, forcing the target audience to think. Abbreviations, figurative and ambiguous sentences, nicknames and similes are the most used features of political language. Neuman defines this concept as an interpretation in which someone appears to be saying something new but speaks in circles and makes circular reasoning by making a true statement (Durgun and Yaman, 2017).

The Importance of Social Education in Political Communication
Education is an essential element of the development of a society. Societies need education to develop, modernize and progress. Education educates the individual and enables him to take his role in society. Thanks to education, the political awareness of society is formed, and it significantly contributes to the formation of political preferences. As the education level of the individual increases, his political preferences also diversify. In modern societies, many reasons, such as the high level of education, the fact that individuals have a greater awareness of social responsibility, the absence of obstacles to participation, etc., increase the intensity of participation in politics (Altan, 2011). Education, which has a vital role in the continuation of political culture, contributes to forming their political preferences by informing individuals about the political system. Mass media, one of the most critical political communication tools, changes the existing culture using political language and ensures the formation of a new dominant political culture.

Method
The most commonly used method in analyzing news is the discourse analysis method. Studies on news texts, on the other hand, are generally carried out by analyzing and revealing objective, unbiased and unbalanced texts with various analyses (Şeker, 2009). Critical discourse analysis systematically explores explicit or implicit causality. It determines relationships between discursive practices, events, and texts as broader social and cultural structures, relations, and processes (Bostancı, 2016). It is possible to present Teun A. van Dijk's critical discourse analysis model in the following table (Özer, 2011).

The study, the front page headlines and subheadlines of 5 newspapers were examined based on VanDijk's Critical Discourse Analysis. Qualitative research methods will be used to decipher disinformation in the 2020 TRNC Presidential elections. Qualitative research is conducted without using any hypotheses and statistical tests to study a topic or problem (Hoephl, 1997). In qualitative research, statistical data are not needed to confirm the results. Data sources include people and articles, official records, letters, newspaper articles, diaries, reports, printed articles on the relevant subject and video recordings (Erdoğan, 2012).

Analysis of the Discourses of Political Leaders in the TRNC and the Languages They Use in Terms of Education
In the study, the Presidential Election is limited to the headline and subheadline news of the newspapers Cyprus, Yenidüzen, Güneş, Avrupa and Volkan published on 19, September 26, 3, 10 October before the first round and 14, 15, 16 and 17 October before the second round, including the discourses of the Presidential candidates Ersin Tatar and Mustafa Akıncı on the selected days. The fact that the Presidential Election coincided with the period of intense COVID-19 pandemic measures, the fact that the election took place under extraordinary conditions, the printed newspapers could not healthily continue their publications due to intense health measures and economic

problems, causing them to print on certain days of the week. In some of the periods determined in our study, some selected dates were different since there was no pressure from the Volkan newspaper. The dates of 18, September 24, 2, 9 October and 13-16 October, which are closest to the generally determined dates, were chosen. In the period covered by the study, two headlines and three headlines were published in the Cyprus newspaper, one headline in the Yenidüzen newspaper, five headlines and one headline in the Güneş newspaper, and two headlines in the Avrupa newspaper about the Presidential elections, while Volkan, a nationalist and conservative opinion newspaper, used headlines and headlines containing the ideology of the newspaper instead of the candidates' discourses.

A total of 14 headlines and subheadlines were generally supported by photographs to increase the credibility of the discourse. The language used in the headlines and subheadlines, the size of the letters, whether they are positive or negative, whether they are direct or indirect, naming, allusions, predicate-valuing ascriptions, whether the parties subject to the news are included, whether the language used about the parties is impartial or not were determined and examined.

Result

The 2020 TRNC Presidential Elections, which took place under extraordinary COVID-19 pandemic conditions, took place in a fierce competition environment between Prime Minister Ersin Tatar and President Mustafa Akıncı, despite being multi-candidate. While the candidates used the print media intensively, they conveyed their ideologies and political views to the voters through the political language and discourses they used. "Linguistic messages are also an essential tool of politics. The essence of political discourse lies in examining, defining, and limiting various aspects of social institutions and evaluating concepts such as authority, competence, science, family, structure, and gender-related to that institution. From this point of view, political discourse is not neutral regarding language but is shaped by syntactic forms.

In the 2020 Presidential Election, relations with Turkey, the independence and sovereignty of the TRNC constituted the main agenda of the election, while the Cyprus issue and economic problems remained in the background. Nationalist and conservative candidate Ersin Tatar, while completely opposing the federation thesis, argued that the sovereign equality of the TRNC is the primary condition for the solution of the Cyprus issue. Mustafa Akıncı, whom liberal and left-wing voters supported, argued that the Turkish Cypriot people should be independent and have their own will and that the Cyprus issue should be resolved in the light of the UN parameters. Since 2017, Akinci has experienced tensions with the Turkish government. Both candidates demanded support from society by promising better economic conditions and a safer future in a way that voters wanted to hear about the current positive or negative developments with the political language they used. The five newspapers selected in our study follow an editorial policy based on ideological and economic grounds.

Yenidüzen and Güneş newspapers published in line with the ideologies and views of the political parties they represented. Yenidüzen newspaper did not reflect Akıncı's rhetoric in its headlines and subheadlines and followed a direct anti-Turkey editorial policy. Güneş newspaper frequently included the discourses of Ersin Tatar, the head of the party it is affiliated with, in its headlines and subheadlines. It reflected Tatar's messages to the voters as positive and anti-Akıncı by using effective political language. Avrupa and Volkan newspapers are newspapers of opinion and have uncompromisingly reflected the ideologies they represent in their publications. Both newspapers reached the target audiences with headlines and headlines representing their ideologies instead of the candidates' rhetoric.

As always, the Cyprus newspaper has followed a publication policy in line with the economic interests of its owners. While the 2003 Annan Plan supported the CTP candidate in the referendum process and the 2004 Presidential Elections, it supported the UBP candidate, who adopted utterly opposite views, in the 2020 elections. The sale of the Cyprus newspaper in December 2022 to a large capital group, including Turkey's largest publicly traded electricity producer, AKSA, was not a positive development for the media sector. AKSA's sale of electricity to the TRNC, its participation in public tenders and the fact that its primary purpose is profit cast a shadow on the impartiality of the media. After the Cyprus newspaper changed hands, it continued its publications by assuming the identity of the party newspaper of the UBP, like the Güneş newspaper. The newspaper, which has gained a new shareholder structure without connection with the Turkish Cypriot people, has limited opportunities to offer to the community.

In the 2020 TRNC Presidential elections, the media followed broadcasting policies in line with the ideologies, ideas or interests they represented instead of objective journalism, where the media was divided. In other words, there is the domination of minds through the media (Aşkın, 2016). The fact that the facts are hidden, obstructed and manipulated by the perception of the masses harms the concept of democracy and freedom. While the political language used can benefit society, it can also be to the detriment of society and mislead the masses. Therefore,

freedom and democracy should be guaranteed by solving the media's disinformation, coding and manipulation techniques and conveying accurate and impartial news to the target audiences. In democracies, accurate and healthy information is needed to control the governments. The disinformation applied by the media prevents public institutions and especially the government from fulfilling their duties, harms democracies, and paves the way for the protection of the interests of a powerful minority. Independent and unrestricted media is essential to democratic, open societies (Bostancı, 2016).

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Pre-service Teachers' Approach Preferences in Geometry Problems: Analytic, Synthetic or Vectorial?

Asst. Prof. Dr. Demet BARAN BULUT
Recep Tayyip Erdoğan University, Faculty of Education, Department of Mathematics and Science Education, Rize, Türkiye
Email: demet.baran@erdogan.edu.tr
ORCID ID: orcid.org/0000-0003-1085-7342

Prof. Dr. Bülent GÜVEN
Trabzon University, Fatih Faculty of Education, Department of Mathematics and Science Education, Trabzon, Türkiye
Email: bguven@trabzon.edu.tr
ORCID ID: orcid.org/0000-0001-8767-6051

ABSTRACT
The aim of this study is to examine the effect of the learning environment designed based on different approaches on the change in pre-service teachers' approach preferences and geometry achievement in geometry problems. Twenty pre-service mathematics teachers were involved in geometry lessons for 10 weeks in a learning environment designed based on Analytic Approach (AA), Synthetic Approach (SA) and Vectorial Approach (VA). There were six geometry problems in the pre-test and post-test administered before and after the implementation, respectively. The solutions of the problems in these tests were evaluated by means of a rubric. Then, two pre-service teachers with "high", "medium" and "low" achievement levels were identified based on the scores obtained from these tests and clinical interviews were conducted with them. As a result of the study, it was determined that the most preferred approach before and after the implementation was SA. However, it was determined that AA and VA, which were less preferred before the implementation, were preferred more after the implementation. In addition, the designed learning environment contributed positively to pre-service teachers' geometry achievement. It was determined that the success of the pre-service teachers in the post-test solutions increased considerably compared to the pre-test. It is thought that it is important to design other courses in the university, for example; Analytic Geometry course should be supported with SA and VA or the Algebra course should be supported with AA and VA and presented to prospective teachers in a new structure.
Keywords: Analytic approach, Synthetic approach, Vectorial approach, Learning environment, Geometry problems

INTRODUCTION
Geometry is accepted as an important field within the scope of mathematics education from primary school level to university level because it has an important implementation area in other sub-fields of basic mathematics, provides people with the power of spatial perception and develops problem solving skills by activating the mind (Baki, 2002; Sherard, 1981; Temur, 2007). Considering both the general aims of geometry education and the qualities that geometry education provides to the individual, the emphasis on the development and contribution of geometry to the development of problem solving skills in individuals draws attention. The National Council of Teachers of Mathematics (NCTM, 2000), which draws attention to the development of geometry in some skills of students, expresses geometry as a field that develops students' problem solving, reasoning, association, communication and verification skills. According to NCTM (2000), thanks to these skills created by geometry in individuals, students can activate their minds, analyze and solve problems, make comparisons and establish connections between mathematics and life. In addition, geometry offers an implementation area for the development of students' inference and proof skills (NCTM, 2000). According to Ball (1988), in the mathematics teaching process, the subfields of mathematics are presented to students in discrete sections and students are rarely encouraged to make connections between the different ideas they have learnt, and situations where students can solve problems by making connections between different approaches are not created in learning environments. However, one of the ways of constructing mathematical knowledge is connectedness. According to NCTM (2000), making use of the sub-fields of mathematics helps students to establish a stronger connection between their mathematical knowledge. Establishing mathematical connections between subfields (e.g., between different concepts, their different representations, different topics and different areas within mathematics, as well as between mathematics and other subjects) is a very important part of mathematical understanding (Dreyfus & Eisenberg, 1986; Hiebert & Carpenter, 1992; Kieren, 1990; Sfard, 1991; Sierpinska, 1994; Skemp, 1987). A person who cannot establish this connection has to memorize many different concepts and methods. Making connections between the mathematical ideas that an individual has means combining new ideas with related ideas and solving mathematical situations by using similar concepts and methods that will be useful in new situations.

When the literature is examined, it is seen that the studies on the solutions of geometry problems generally consist of using a single approach in solving problems (Barbeau, 1988; Dindyal, 2003; Kwon, 2012; Pambuccian, 1993). However, it can be thought that a learning environment that offers a broader perspective that can affect students' problem solving processes will be created by using problems that can be solved through different approaches within the scope of geometry course. In this way, the superior aspects of the solutions of a problem can be revealed more clearly if they are supported by the implementations made with the students.

Geometry problems in which different approaches are used in their solutions are accepted as an effective teaching tool that will enable students to establish the connection between geometry and other fields (House & Coxford, 1995; Leikin, 2003, 2007; NCTM, 2000; Polya, 1973; Schoenfeld; 1983; Silver, 1997). If we want to look deeper into the teaching activities that support solving problems using more than one approach, Leikin et al. (2006) and Leikin and Levav-Waynberg (2007) used problems that require finding the solution of a given geometry problem using more than one approach in their studies. The difference between the solutions of such problems is indicated as different representations of the mathematical concept, different properties of mathematical concepts (definitions, theorems, auxiliary elements, etc.) or the use of theorems and tools belonging to subfields of mathematics (Leikin, 2007; Leikin & Levav-Waynberg, 2007; Leikin & Levav-Waynberg, 2008). Analytical Approach (AA), Synthetic Approach (SA) and Vectorial Approach (VA), which use definitions, theorems, etc. in the subfields of geometry and algebra, respectively, can offer the opportunity to look at the solutions of geometry problems from a different perspective. With this different perspective gained in the solutions of geometry problems, students will be able to establish a connection between the mathematical knowledge they have and, in this process, they will have the opportunity to meet with learning environments where different approaches are used together in geometry problem solving.

AA is a method that allows to solve geometric problems by using the coordinate system, the discovery of Decartes. In this approach, geometric properties are combined with algebraic methods. Here, students are asked to choose the coordinate system that will make the solution as comprehensible as possible and to interpret the equations obtained in terms of the problem.

To solve problems in this approach;
1. Distance between two points,
2. Equation of a line given a point and slope,
3. Equation of a line with two given points,
4. Lines with equal slopes are parallel,
5. If two lines are perpendicular, the product of their slopes is -1
basic features such as the basic features should be known at least to a minimum extent (French, 2004).
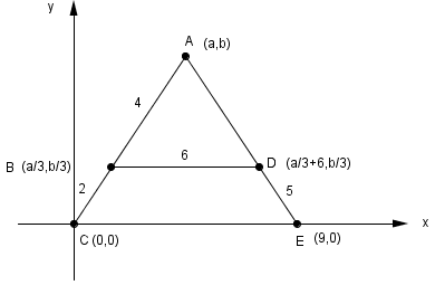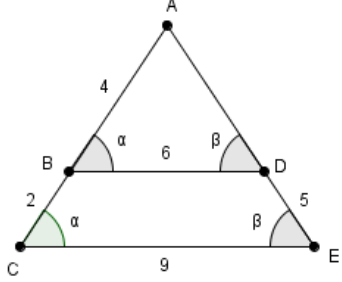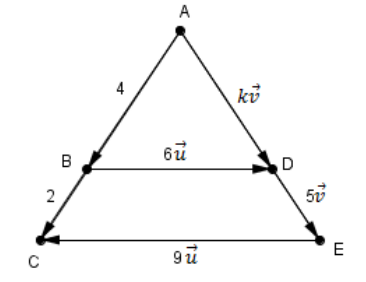
The teaching of Euclidean geometry has a very important place at every stage at school level. On the other hand, the problem solving approach using Euclidean geometry encountered at every stage of the education period is defined as SA. This method is based on axioms, postulates and theorems (Ministry of National Education [MoNE], 2010). In geometry problems solved through this approach, axioms, postulates and theorems of geometry are used. When the studies involving problem solving in geometry are analysed, it is seen that different paths belonging to only one approach are generally used and different paths belonging to SA or AA are used in geometry problem solving, but the connectivity between approaches is not mentioned (Levav-Waynberg, 2011; Levav-Waynberg & Leikin, 2006; Sierpinska, 2000; Silver et al., 2005). On the other hand, there are very few studies in which VY is used in geometry problem solving. However, including the connectedness feature, which has an important place in the construction of mathematical knowledge, in the implementations in the problem solving process and reconsidering the courses carried out in this context may contribute to the development of students in problem solving processes.

Vectorial Approach is mainly based on knowledge in algebra and vector space. This approach, which is based on combining geometry and algebra, has gradually taken its place in many curricula. Some researchers agree that plane geometry is too much dominated by Euclidean geometry. At the Cambridge Conference of School Mathematics (1963), a view was presented that "there are many ways of teaching geometry which can be followed, and which have their own advantages". One of these is VA. While the coordinate plane is utilized in the representation of vectors, it is also seen that implementations through matrices are also used. In the following, it is discussed how a problem can be answered with these three approaches:

Problem: In the figure below, if BD // CE is |AB|=4,|BC|=2,|BD|=6,|DE|=5 and |CE|=9, then |AD|= ?

Solution:

Solution with Analytical Approach	Solution with Synthetic Approach	Solution with Vectorial Approach
$$\|DE\| = \sqrt{\left(\frac{a}{3}+6-9\right)^2 + \left(\frac{b}{3}-0\right)^2} = 5$$ $$= \left(\frac{a}{3}-3\right)^2 + \left(\frac{b}{3}\right)^2 = 25 \quad \dots (1)$$ $$\|BC\| = \sqrt{\left(\frac{a}{3}-0\right)^2 + \left(\frac{b}{3}-0\right)^2} = 2$$ $$= \left(\frac{a}{3}\right)^2 + \left(\frac{b}{3}\right)^2 = 4 \quad \dots (2)$$ $$(1) \Rightarrow \left(\frac{a}{3}\right)^2 - 2a + 9 + \left(\frac{b}{3}\right)^2 = 25$$ $$-2a + 13 = 25$$ $$a = -b \dots (3)$$ $$\|AB\| = \sqrt{\left(a-\frac{a}{3}\right)^2 + \left(b-\frac{b}{3}\right)^2} = 4$$ $$= \left(\frac{2a}{3}\right)^2 + \left(\frac{2b}{3}\right)^2 = 16 \quad \dots (4)$$ $$\|AD\| = \sqrt{\left[a-\left(\frac{a}{3}+6\right)\right]^2 + \left(b-\frac{b}{3}\right)^2}$$ $$= \sqrt{\left(\frac{2a}{3}-6\right)^2 + \left(\frac{2b}{3}\right)^2}$$ $$= \sqrt{\left(\frac{2a}{3}\right)^2 - 8a + 36 + \left(\frac{2b}{3}\right)^2}$$ $$From\ (3)\ ve\ (4)$$ $$\sqrt{16 + 48 + 36} = 10\ cm$$	Since BD // CE $$m(\widehat{ABD}) = m(\widehat{ACE})$$ $$m(\hat{A}) = m(\hat{A})$$ $$m(\widehat{ADB}) = m(\widehat{AEC})dir$$ Then from the Angle-Angle-Angle Similarity Theorem; $$\overset{\triangle}{ABD} \sim \overset{\triangle}{ACE}$$ Then; $$\frac{\|AB\|}{\|AC\|} = \frac{\|AD\|}{\|AE\|}$$ $$\frac{4}{6} = \frac{\|AD\|}{\|AD\| + 5} \Rightarrow 4\|AD\| + 20 = 6\|AD\|$$ $$\|AD\| = 10\ cm$$	$$\overrightarrow{AB} = 2.\overrightarrow{BC}$$ $$\overrightarrow{DE} = 5\vec{v}\ and\ \overrightarrow{AD} = k.\vec{v}$$ $$\overrightarrow{AC} = k\vec{v} + 5\vec{v} + 9\vec{u}$$ $$\overrightarrow{AB} = k\vec{v} + 6\vec{u}$$ $$\overrightarrow{AC} = \frac{3}{2}\overrightarrow{AB}$$ $$k\vec{v} + 5\vec{v} + 9\vec{u} = \frac{3}{2}(k\vec{v} + 6\vec{u})$$ $$2k\vec{v} + 10\vec{v} + 18\vec{u} = 3k\vec{v} + 18\vec{u}$$ $$10\vec{v} = k\vec{v}$$ $$k = 10 \Rightarrow \|\overrightarrow{AD}\| = 10\ cm$$

A student who gains problem solving skills in geometry is expected to be able to associate the properties of geometric figures, make proofs and use coordinate plane and vectors in problem solving (Swings & Peterson, 1988). It is thought that the problem solving skills gained in geometry also support students to establish a relationship between geometry and the subfields of mathematics (numbers, measurement, algebra, probability and statistics) (MoNE, 2010).

Although SA, AA and VA, which are based on the connection of geometry with other fields in students' problem solving, have a place in geometry as a field of study, Euclidean geometry comes to mind almost all over the world when school geometry is mentioned (Dindyal, 2003). Geometry lessons are based on the SA consisting of the theorems developed by Euclid and their proofs (Kwon, 2012). For these reasons, students cannot be involved in an appropriate learning environment where they can make connections between their thoughts while solving problems or trying to prove a theorem. On the other hand, they encounter very few opportunities to unleash their creative abilities involving broader mathematical methods such as algebraic-analytical methods.

Considering the contributions that can be provided to students by using different approaches together in solving geometry problems, it is necessary to support geometry courses by using different approaches instead of focusing on only one approach. When the mathematics teacher education curriculum in Türkiye is examined, the courses that form the basis of the approaches (analytical geometry, geometry and linear algebra) are given in different years at the university level. It is seen that pre-service teachers who go through such an education process cannot be included in a course in which they will have the opportunity to establish a connection between the information belonging to the approaches. This situation reveals the idea that pre-service teachers are prevented from developing the skills of transferring knowledge and making connections between approaches. In general, the contents of these courses have a structure that is carried out only through the relevant approach. In particular, when the geometry course is examined, it is seen that a course content based on SA is carried out instead of using approaches that can offer different perspectives to students together. This situation shows us that the geometry course is in a structure that is far from providing the connectivity feature. Therefore, the necessity of a learning environment in which all three approaches will be used emerges. In this context, within the scope of this study, the content of the geometry course in the secondary mathematics teacher education programme was enriched with analytical and vector approaches by focusing on synthetic geometry and a learning environment was designed in which all three approaches were used together. The aim of this study is to examine the effect of the learning environment designed based on different approaches on the change in pre-service teachers' approach preferences and geometry achievement in geometry problems.

METHOD
Research Design
In this study, a case study was used since it was aimed to reveal the change in pre-service teachers' approach preferences in geometry problem solving after the designed learning environment. This study did not only focus on the pre-service teachers' preferences in the problem solving process, but also aimed to reveal the reasons underlying their preferences. Thus, it was also possible to reveal how and why the pre-service teachers' approach preferences changed when they were provided with a learning environment with more than one approach. On the other hand, as expected from pre-service teachers, this study provided an opportunity to examine the change in their problem solving achievements in an environment that would associate other areas of mathematics in geometry problems.

Context of the Learning Environment
While designing the learning environment based on AA, SA and VA. SA was taken as the basis and the process was supported with AA and VA. In the learning environment, the content was enriched by adding theorem proofs using SA and their implementations and geometry problems, and solutions to each theorem and problem with AA and VA. In the content applied for 10 weeks, 2 hours theoretical lesson was conducted with SA. The two-hour implementation process was designed in a way to enable the use of AA and VA in geometry problem solutions. Pre-service teachers were encouraged and guided to use other approaches along with SA while solving geometry problems. After each problem solution, the solutions made with all three approaches were written on the board and a discussion environment was created on the solutions. The model showing the designed learning environment is presented in Figure 1.
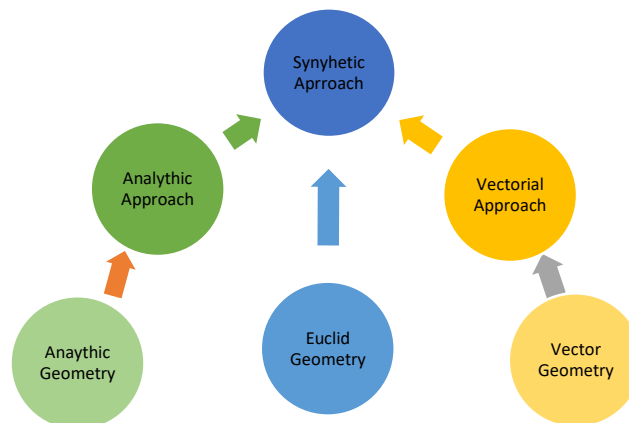
Figure 1. Learning Environment Model Based on AA, SA and VA

Research Sample
The sample of the study consisted of 20 prospective teachers studying in the secondary mathematics teaching program of a state university in Türkiye. Since modern learning theories argue that learning is based on prior

knowledge, it is necessary for pre-service teachers to have prior knowledge of these approaches in order to use AA, SA and VA in geometry problem solving. In the learning environment designed to enable the use of AA, SA and VA together in geometry problem solving, pre-service teachers needed to have prior knowledge such as the distance between two points, the equation of a line given a point and its slope, the equation of a line given two points, the parallelism of lines with equal slopes, the product of the slopes of perpendicular lines, etc. in order to solve with AA. For this reason, the fact that the pre-service teachers who constituted the sample of the study had taken the Analytic Geometry course including this information in the undergraduate programme they studied was considered sufficient to provide the pre-competencies they should have for AA. In order to be able to use VA in solving geometry problems, pre-service teachers should have mastered the contents of topics such as vectors, matrices, determinants, systems of linear equations. This situation necessitated that pre-service teachers should have taken Linear Algebra-I and Linear Algebra-II courses including the above topics in order to have these pre-competencies. Only in this way, it could be accepted that pre-service teachers had the competence to use VA in problem solving. Therefore, it was important for the pre-service teachers forming the sample of the study to have taken Analytic Geometry and Linear Algebra courses, which form the basis of AA and VA, in order to be able to solve geometry problems with all three approaches in the designed learning environment. In this direction, while selecting the pre-service teachers constituting the sample of the study, it was paid attention that they had taken these courses. After the selection of pre-service teachers; analytical, synthetic and vectorial approaches were introduced to the group involved in the learning environment designed based on AA, SA and VA, the superior aspects of the approaches were discussed and problem examples using these approaches were presented.

Data Collection Tools
Two separate tests were created to reveal the geometry achievement of pre-service teachers and the approaches they prefer in geometry problem solving. While preparing the pre-test and post-test, various sources were utilized (Kisacanin, 2002; French, 2004; Aydın et al., 2011; MoNE, 2011; Ok, 2013). The problems used in these tests were evaluated by two researchers who are experts in the field of mathematics education. The experts have a doctorate degree in mathematics education. Evaluation meetings were held with the experts within the scope of the expert review method. In these meetings, the purpose of the study and the purpose of the achievement test to be developed were verbally expressed to the experts by the researcher. The problems and solutions selected for the tests were presented to the experts in writing and they were asked to evaluate the problems in terms of structure and content. After making the necessary examinations, the experts asked questions to the researcher, if any, and gave feedback on the suitability of this data collection tool. Thus, the internal validity of this data collection tool was ensured with expert opinions. These tests consist of six parallel problems. The pre-test was administered before the designed learning environment and the post-test was administered afterwards. Each of the geometry problems in these tests has solutions with all three approaches. For the problems in the tests, pre-service teachers were asked to make solutions with any approach they would choose. The pre-service teachers were given a total of 100 minutes to answer the tests.

With the clinical interviews conducted, it is aimed to determine the reasons for pre-service teachers to prefer the approaches they use in the problem solving process. The pre-service teachers selected for the clinical interviews were chosen from different achievement levels (high, medium, low) according to their test scores. During this selection, pre-service teachers' volunteering to participate in the interviews was also taken into consideration. The interviews conducted to determine the approach preferences of the pre-service teachers in their solutions were based on the problem solutions they made in the pre-test and post-test. During the interviews, pre-service teachers were asked questions such as "What is the reason for using the approach you preferred in problem solving?", "How did you determine that the approach you chose in problem solving was the most appropriate approach for this problem?", "Why did you need to change the approach you used in problem solving?". In the tests, the pre-service teachers were asked to explain how they reached the solutions they made with the approach they preferred for each problem. The interviews with the pre-service teachers were conducted individually and lasted approximately 45 minutes.

Data Analysis
The solutions given by the pre-service teachers to the problems in the tests were analyzed using the rubric developed by Malone et al. (1980). Some arrangements were made on the rubric by taking into account the aims of the study. This scoring key was preferred because the criteria in the scoring key were close to the steps that the prospective teachers went through in the problem solving process in this study. The original and revised versions of the rubric used for the analysis of the problem solving process are given in Table 1.

Table 1: Original Rubric and Revised Rubric Used for the Analysis

	Original version of the rubric	Revised version of the rubric
Degree	Description	Description
0	The prospective teacher could not answer the question at all, wrote only what was given or wrote unnecessary expressions that were not used for the solution.	0-Point: The participant did not write anything about the solution, only what was given in the problem or expressions that did not contribute to the solution.
1	The prospective teacher wrote at least one necessary and valid statement for the solution and gave reasons for it.	1-Point: The participant wrote at least one necessary and valid statement for the solution of the problem and gave reasons for it.
2	The prospective teacher did almost half of the solution by using the appropriate chain of reasoning, but the solution was not completed due to the incorrect expressions used in the previous steps.	2-Point: The participant completed some steps in the problem solution correctly by using the appropriate reasoning chain, but could not complete the solution due to the incorrect expressions used in the previous steps.
3	The prospective teacher did all the steps of the solution correctly, but he/she made mistakes in the notations, words or names of the theorems he/she used during the solution.	3-Point: The participant completed the problem solution steps almost correctly, but made mistakes in the notations, words or names of theorems used during the solution.
4	The prospective teacher completed the solution with a maximum of one error in the representations.	4-Points: The participant has completed all the required solution steps.

In this scoring, the lowest score that prospective teachers can get as a result of solving a problem with each approach is 0, while the highest score is 4.

The problem solutions in the pretest and posttest were scored by two separate researchers according to the rubric. Afterwards, two researchers came together to re-evaluate the solutions with different scores and completed the scoring by reaching a consensus.

The data set obtained from the clinical interviews was coded by two separate researchers. In order to reach a consensus on the differences in the codes, the researchers came together to re-evaluate the data and the coding was finalized. In addition, in order to ensure the validity of the data, quotations from the clinical interviews conducted on the problem solutions made by the pre-service teachers were given in the paper.

FINDINGS

In this section, the approaches that pre-service teachers preferred while solving geometry problems before and after the designed learning environment and the reasons for their preferences were determined. Table 2 presents the approach preferences of pre-service teachers in solving the problems.

Table 2: Pre-service Teachers' Approach Preferences in Problem Solving

Approach	AA		SA		VA		No Answer		Total	
	n	%	n	%	n	%	n	%	n	%
Approach Preferences in the Pre-Test	8	6.7	79	65.8	10	8.3	23	19.2	120	100
Approach Preferences in the Post-Test	36	30	56	467	26	21.7	2	1.7	120	100

According to Table 2, when the solutions in the pre-test were analyzed, SA was preferred in 79 (65.8%) solutions, VA in 10 (8.3%) solutions and AA in 8 (6.7%) solutions. The remaining 23 (19.2%) solutions were left blank. According to the findings obtained from the pre-service teachers' approach preferences in problem solving before the implementation, it was determined that the most preferred approach was SA. The preference rate of this approach is quite high. The second most preferred approach was VA. The last preferred approach was AA.

According to the findings obtained after the implementation, it is seen that pre-service teachers preferred SA in 56 (46.7%) solutions, AA in 36 (30%) solutions and VA in 26 (21.7%) solutions. The remaining 2 (1.7%) solutions were left blank. After the implementation, it was determined that the most preferred approach for problem solving was SA. After the implementation, the second most preferred approach was AA and VA was preferred in the last place in problem solving. After the implementation, it was observed that the approach preferences were not concentrated in SA but also distributed to other approaches. It was also found that the number of solutions left

blank decreased.

In order to examine the pre-service teachers' approach preferences before and after the implementation in more detail, clinical interviews were conducted with two pre-service teachers selected from each of the "good", "medium" and "low" levels determined in line with the scores obtained from the tests applied to the pre-service teachers. These pre-service teachers were coded as T-1, T-2, T-3, T-4, T-5 and T-6. T-1 and T-2 were selected from "low" achievement level, T-3 and T-4 from "medium" achievement level, and T-5 and T-6 from "high" achievement level. The interviews were conducted based on the problem solutions of the pre-service teachers in the tests.

Firstly, the reasons underlying the preference of pre-service teachers for AA before and after the implementation were analyzed. In this direction, according to the findings obtained from the interviews, the reason for pre-service teachers' preference for AA in problem solving is categorized under one code before the implementation and two codes after the implementation. Table 3 showing the frequency of these codes in the pre-service teachers who participated in the interviews is presented below.

Table 3: Frequency of Pre-service Teachers' Prevalence of the Codes Created for Preferring AA

	Code	T-1	T-2	T-3	T-4	T-5	T-6
Before the Implementation	Given in the Problem	1	1	-	2	1	-
After the Implementation	Placing the Geometric Shape on the Coordinate Plane	1	3	1	4	1	1
	Given in the Problem	-	2	-	1	2	-

Below are examples of pre-service teachers' views under these codes. The solution of a problem made by T-1 under the code "Given in the Problem" before the implementation and the reason for preferring AA in this solution are presented below.
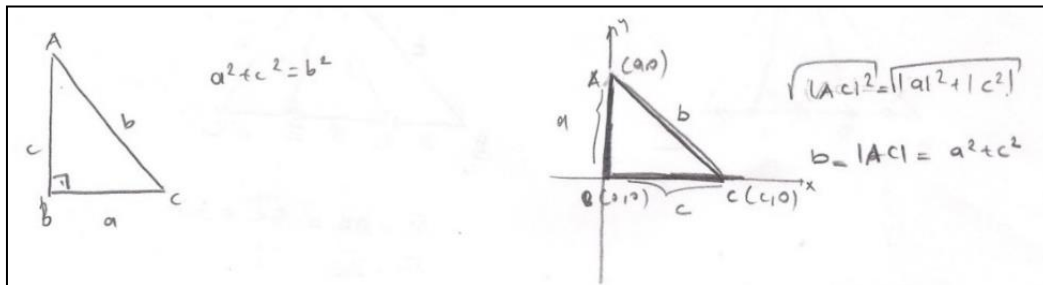
Figure 2. The Solution in which T-1 prefers AA

Researcher: You preferred to use the analytical approach in solving this problem. What is the reason?
T-1: I wrote the Pythagorean theorem here (showing the figure on the left). The expression in the Pythagorean theorem reminded me of the distance formula between two points in analytic geometry. For this reason, I placed any right triangle on the analytical plane and solved it.

As a result of the interview, the reason why T-1 preferred the analytical approach in problem solving was that the expression of the Pythagorean theorem given in the problem evoked the distance between two points in analytical geometry.

Another pre-service teacher who had an opinion under this code was T-4. The solution of the pre-service teacher and the dialogue carried out are presented below.
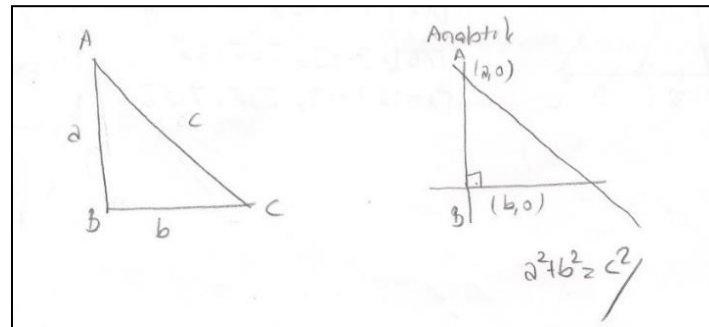
Figure 3. The Solution in which T-4 prefers AA

Researcher: You tried to do the Pythagorean theorem with the help of analytical approach. What is the reason that led you to this preference?

T-4: In the Pythagorean theorem, there is a right angle in the triangle. I thought it would be easier to place this shape on the coordinate plane.

Researcher: How did you think the right angle given in the question would be easier to use in the analytical plane?

T-4: If a right angle is given in a question, I think it is easier to use the analytical approach. Because when we place the shape on the coordinate plane using the starting point, the solution is seen more easily.

In the dialogue conducted over the analytical solution of T-4, the pre-service teacher has the opinion that it would be easier to solve the problem by placing the right-angled triangle in the Pythagorean theorem given in the problem on the analytical plane. It is thought that the solution will be much easier by placing the corner corresponding to the right angle of the right-angled triangle at the origin of the analytic plane. For these reasons, T-4 prefers to solve this problem with the analytical approach.

According to the findings obtained from the interview conducted after the implementation, the first reason for pre-service teachers to prefer the approaches they used in problem solving was that the geometric shape expressed in the problem could be easily placed in the coordinate plane. All pre-service teachers expressed their opinions under this code. The opinion expressed through the problem solution of T-3 is presented below. The solution of the pre-service teacher belongs to problem 1.
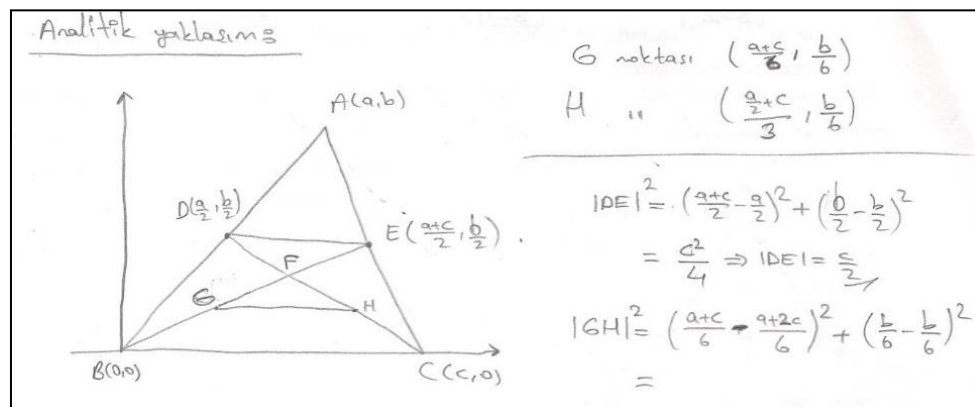
Figure 4. The Solution in which T-3 prefers AA

Researcher: What was the reason for preferring analytical approach in this problem?

T-3: There is an ABC triangle and I thought that if I place a corner of this triangle at the origin on the coordinate plane, the base of the triangle will be on the x-axis. In this way, it will be easy to place the corners of the triangle and the points given in the problem on the coordinate plane.

Researcher: Is there any other factor that pushed you to analytical approach in this problem?

T-3: As I said, one of the coordinates of the base side of the triangle will be (0,0), the other will be (c,0). I thought that the ratio of the sides required in the problem could be found very easily from the distance between the two points. Therefore, I used this approach.

The geometric shape given in the problem had a great effect on the T-3's preference for AA in his solution. The

pre-service teacher stated that it was quite easy to place a triangle on the coordinate plane and to determine the vertices of this geometric shape on the coordinate plane. The opinions that determining the base on the x-axis after placing a corner of the triangle to the origin on the coordinate plane contributed to the operations in the problem solution also pushed the pre-service teacher to prefer AA. On the other hand, the fact that the lengths of the two line segments to be found in the problem were equal reminded the distance formula between two points in the coordinate plane. For these reasons, the pre-service teacher preferred to use AA in the solution.

In the code of "Given in the problem" determined after the implementation, the opinions of T-2, T-4 and T-5 are available. While this code was formed, it was determined that the expressions given in the problems in the test were effective in preference of the approach. The pre-service teachers' preference for the approach as a result of the association of some concepts or expressions with the concepts in the fields that form the basis of the approaches (analytical geometry, Euclidean geometry, vector algebra) were collected under this code. In order to give an example of this situation, the statement belonging to T-2 is given below.

> *T-2: If there is perpendicularity in the question, I use analytical approach because the perpendicularity in the analytical plane makes me feel that this approach can be more useful for the solution. Thus, I think that the solution will be a little easier. I used analytical approach in such questions.*

According to the above statement of T-2, a connection was established between the properties of the coordinate system, which is the basic element used in the field of analytical geometry, and the properties given in the problem. It is stated by T-2 that an easier solution can be followed by placing the corner where the right angle in the right triangle in the related problem at the starting point in the coordinate system. Thus, one of the reasons for preferring the approach used in problem solving is that some concepts or expressions given in the problem evoke the expressions and concepts used in the related approach. For this reason, the expressions given in the problem play an active role in pre-service teachers' preference for the approach they will use in their solutions.

The reasons for the preference of SA, which is the most preferred approach by pre-service teachers before and after the implementation, are gathered under 5 codes before the implementation and under 3 codes after the implementation. Table 4 showing the frequency of the codes determined for the reasons for pre-service teachers' preference for SA before and after the implementation is presented below.

Table 4: Frequency of Pre-service Teachers' Prevalence of the Codes Created for Preferring SA

	Codes	T-1	T-2	T-3	T-4	T-5	T-6
Before the Implementation	Having Experience	4	2	1	4	2	4
	Newness of Other Approaches	1	2	-	1	2	5
	Given in the Problem	-	3	-	4	2	2
	Preventing Mathematical Operation Intensity	1	2	-	1	-	-
	SA is Necessary to Solve Problems with Other Approaches	-	1	-	-	-	1
After the Implementation	Habituation to SA	3	-	1	2	2	3
	Given in the Problem	-	-	3	1	1	1
	Feeling Safe	-	1	-	2	-	2

When Table 4 is analyzed, the code containing the highest number of pre-service teachers' opinions under the codes consisting of the reasons for pre-service teachers to prefer SA in problem solving before the implementation is "Having Experience". This code includes the opinions of all pre-service teachers. There are five pre-service teachers' opinions under the second code. In the third code in the table, there are four pre-service teachers' opinions. The frequency of pre-service teachers' opinions under the second and third codes is the same. Three pre-service teachers expressed their opinions for the fourth code, "Preventing Mathematical Operation Intensity". For the last code, only two pre-service teachers expressed one opinion. This code has the lowest frequency of teacher opinions. Below, each of these codes is examined under subheadings and the dialogues and sample question solutions are given.

Among the reasons why pre-service teachers prefer SA in problem solving processes, the most frequently stated reason is that they have experience in SA. All of the pre-service teachers stated that they had seen the SA before and that they were closer to this approach because they had solved geometry problems only with this approach so far. T-4 made the following statements about his preference for the SA in problem solving.
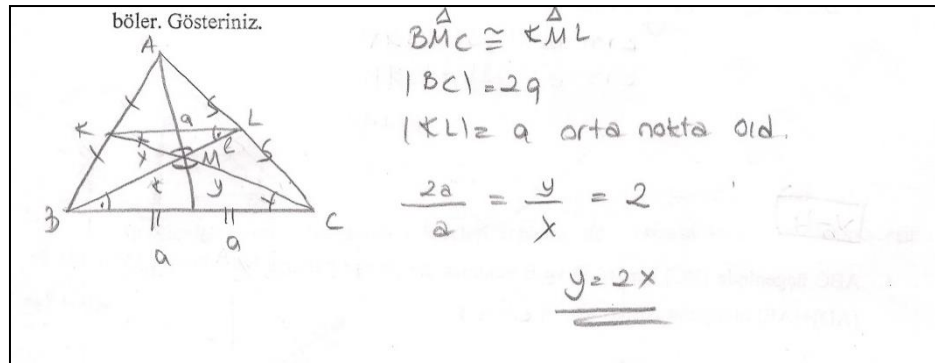
Researcher: What are the reasons that led you to solve the problem with SA in the above problem?
T-4: It was easy for me to draw parallel on the figure. Then I used interior opposite angles from parallelism. From there, I used similarity. Since these were things we already knew before, it was easier.
Researcher: Did you use the SA because of parallelism?
T-4: We have always used parallelism on the figure with the SA before. For this reason, I preferred this approach. We had emphasized on these issues in geometry when we were in high school. For this reason, it is more practical and easier to make solutions with this approach.

T-4 stated that the reason for preferring the SA was that the parallelism feature in the shape of the related problem was always solved with the SA based on his previous experiences. When the pre-service teacher was asked whether only the concept of parallelism in the shape led him to the SA, the pre-service teacher emphasized that he had experience in previous years that these and similar problems were solved with the SA.

"Given in the Problem" code ranked third among the reasons for pre-service teachers to prefer SA. Under this code, the solution of T-4 and the reason for preference are presented below.
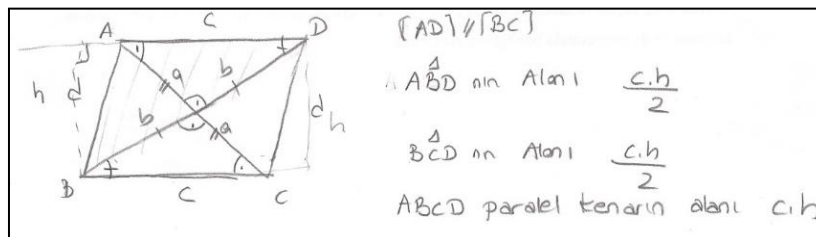
Researcher: You used the SA in this problem. What did you want to do in the solution?
T-4: I tried to go from the area, so I felt that I had to reduce the perpendicular to one side of the rhombus. But I couldn't do it. The situation of reducing the perpendicular here reminded me of the properties we use in SA. For this reason, I preferred to use SA in this solution.

In the solution, the pre-service teacher perceived the word "square" in the expression "squares of the sides" as finding the area of the shape and stated that the area of a shape can be found with a synthetic approach.

One of the underlying reasons for the pre-service teachers to use the SA while solving geometry problems was determined as "Preventing Mathematical Operation Intensity". There are two pre-service teachers' opinions under this code. The first of these belongs to T-2. The problem solution of the pre-service teacher and the dialogue on this solution are presented below.
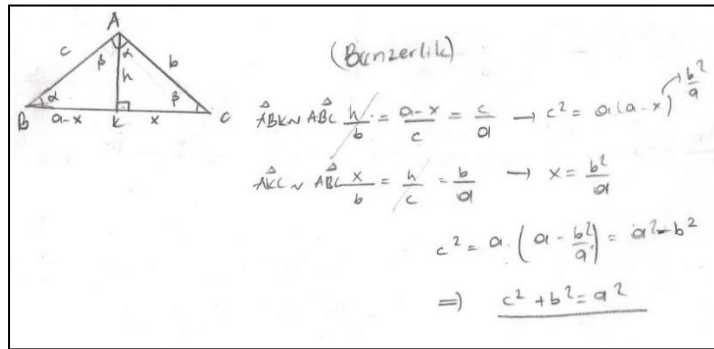
Researcher: What prompted you to use the SA in this problem?
T-2: I think that the synthetic approach allows me to make the similarity in an unprocessed way.
Researcher: What do you mean by operation?
T-2: For example, in the VA, we can ensure that two edges are perpendicular to each other when the inner product of the vectors representing the edges is zero. In the AA, we need to place each point in the figure on the analytical plane and then perform the operation. I think these are computational overheads. In the SA, we can directly write the ratios in similarity. For this reason, I solved with the SA.

T-2 states that the SA gives the result directly. The pre-service teacher, who argues that it is necessary to perform many extra operations to reach the result in AA and VA, states that he prefers the synthetic approach used in the solution of this problem because it prevents redundancy of operations.

After the implementation, the code with the highest number of pre-service teachers' opinions was "Habituation to SA". Only T-2 coded pre-service teacher did not express any opinion for this code. The code "Given in the Problem", which consists of the opinions of four pre-service teachers in total, ranked second. In the last place is the "Feeling Safe" code consisting of the opinions of three pre-service teachers. Below, examples of teacher opinions in these codes will be presented with problem solutions respectively.

The opinions of T-1 under the code of "Habituation to SA" are presented below.

T-1: If I had been taught to solve geometry problems with the VA since my childhood, I would have done it very well. This time the SA would have been foreign to me. If I had learnt the analytical approach at first, the others would have been foreign to me. I think it is nothing but habit. If we had learnt the VA first and not the others, if we had been told that geometry consists of vectors, we would have solved problems very well with the VA. That would have been the case. But for years we have always used the same similarities etc. We always see the same things and this has become like reading and writing. The information in the SA is settling down. The information we use in other approaches is as if it is new information.

Finally, the reasons underlying the pre-service teachers' preference for VA before and after the implementation were analyzed. In this direction, the reasons for pre-service teachers' preference for VA in problem solving before and after the implementation are collected in one code. The frequency of these codes in the pre-service teachers who participated in the interviews is presented in Table 5.

Table 5: Frequency of Pre-service Teachers' Prevalence of the Codes Created for Preferring AA

	Code	T-1	T-2	T-3	T-4	T-5	T-6
Before the Implementation	Using the Properties of Vectors	1	-	-	1	1	-
After the Implementation	Using the Properties of Vectors	1	1	1	3	2	2

When Table 5 is analyzed, the reasons why pre-service teachers preferred VA before and after the implementation are gathered under a single code. Under this code, there are three opinions of pre-service teachers before the implementation and six opinions of pre-service teachers after the implementation. The dialogues conducted with the pre-service teachers and sample problem solutions are given below as examples of the opinions that constitute this code.

Before the implementation, the solution of T-1 for the first problem in the test and the reason for preferring the vectorial approach in this solution are presented below as a dialogue.
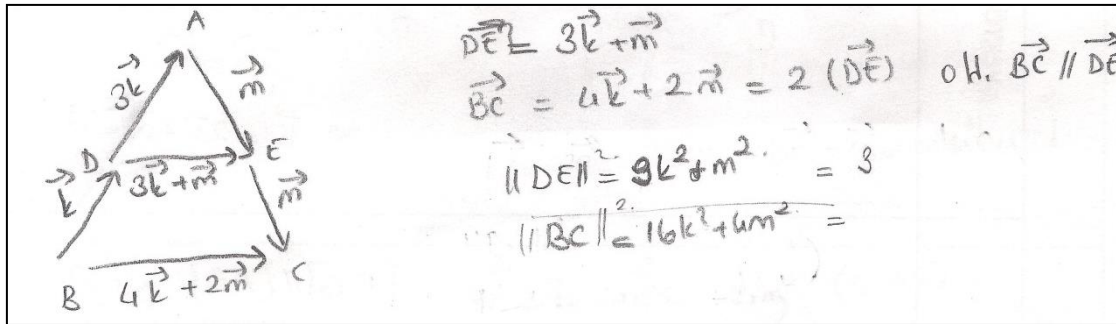
Researcher: What is the reason for using the vectorial approach in this problem? Can you explain?
T-1: Firstly, I drew the given shape with the help of vectors. I tried to write the sides as the sum of the vectors. I think it was easy for me to solve the problem by using the sum of the vectors.

According to the dialogue between the researcher and the pre-service teacher above, T-1 shows that the edges are parallel to each other through the sums of vectors by using the end-to-end addition method from the properties of vectors in the solution she made for the related problem. The pre-service teacher stated that it was easier to solve this problem by using the properties of vectors and preferred the vectorial approach because she could use the properties of vectors.

After the implementation, it was observed that all pre-service teachers had at least one opinion that would form the code "Using the properties of vectors". In these opinions, pre-service teachers want to prefer VA when they think that they can use the properties of vectors that are frequently used in vectorial approach. These properties of vectors include; addition with vectors, determining the directions of vectors, length of vectors, finding the areas of geometric shapes by means of vectors, etc. Pre-service teachers prefer this approach when they think that they can use the vector properties given above in solutions.

The opinions of the pre-service teacher coded T-5 about this code are presented below as an example.

Figure 9. ... VA
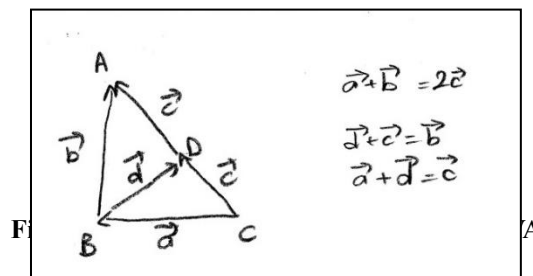
T-5: I tried to draw the right triangle given in the problem with the help of vectors. I used the end-to-end addition method. Thus, I was able to easily create both a large triangle and two small triangles. Based on the shape I created, I wrote the vectors as the sum of other vectors. After all, I know these properties of vectors and it is very easy to use them. For this reason, I wanted to solve with VA.

In the solution of the related problem, T-5 drew the triangle in Figure 9 by using the end-to-end addition method in vectors. He expressed the resulting right triangle ABC and the sides of the triangles BDA, CBD as the sum of the vectors. In line with the opinions received from T-5, he preferred to use this approach because he already knew the vector properties he used in her operations. It can be said that the T-5's knowledge of vectors positively affected their preference for VA in problem solving.

In this study, which examines the approach preferences of pre-service teachers before and after the designed learning environment, it is important for the significance of the study to give their achievement status in the tests. In the other words, not only the change in pre-service teachers' preferences but also the extent to which this situation is reflected in their achievement was determined in this way. Table 6, which shows the achievement status of the pre-service teachers in the pre and post-tests, is given below.

Table 6: Pre-test and Post-test Scores of Pre-service Teachers

		Pre-Test		Post-Test		Total	
		n	%	n	%	n	%
	0-Point	79	65.9	5	4	84	35
	1-Point	17	14.2	1	0.8	18	7.5
Scores	2-Point	4	3.3	12	10.1	16	6.6
	3-Point	10	8.3	27	22.4	37	15.4
	4-Point	10	8.3	75	62.7	85	35.5

When Table 6 is examined, it is seen that in 10 (8.3%) of the solutions in the pre-test, the pre-service teachers were successful by completing all steps correctly. In line with this finding, it is seen that the geometry achievement of the pre-service teachers was quite low before the implementation. In the remaining 110 (91.7%) solutions, the pre-service teachers were considered unsuccessful because they could not complete the problem solving steps correctly. In 75 (62.5%) of the solutions in the post-test, it is seen that the pre-service teachers were successful by completing all steps correctly in their solutions. It was determined that there was an increase in the geometry achievement of the pre-service teachers in the post-test compared to the pre-test. In the remaining 45 (37.5%) solutions, the pre-service teachers were unsuccessful. As a result, it can be said that different approach situations in problem solving presented to pre-service teachers positively affected their geometry problem solving achievement.

CONCLUSIONS AND DISCUSSION
In this study, which focused on the change in pre-service teachers' geometry problem solving preferences due to the learning environment designed based on different approaches, the change in their geometry achievement was also examined.

Before the designed learning environment, the percentages of pre-service teachers preferring AA, SA and VA in problem solving were 6.7%, 65.8% and 8.3%, respectively. The remaining 19.2% was left unanswered. It can be concluded that students who have received an education based on Euclidean geometry throughout their entire education life naturally preferred SA. Similar opinions of pre-service teachers were also obtained in the study. The pre-service teachers stated that they felt comfortable solving with SA, which they were mostly used to. Although they preferred solving with AA and VA, this rate was found to be low. In fact, during the selection of the pre-service teachers, attention was paid to the fact that they had taken Analytic Geometry and Linear Algebra courses. This shows that although the pre-service teachers had sufficient knowledge for AA and VA, they were limited in their preference for these approaches. In some problems, pre-service teachers who thought that the solution process with AA and VA was a difficult and time-consuming process and that it was sufficient to reach a solution with a single approach preferred SA. Similarly, Aydın-Güç (2015) states that in the problem solving process, pre-service teachers think that a single solution method is sufficient and that they do not need to deal with different solution methods. Dowlath (2008), on the other hand, stated that although pre-service teachers know that there are different strategies for solving real life problems, they prefer to use the most familiar strategy for the solution.

After the implementation, the percentages of pre-service teachers' preference for AA, SA and VA were 30%, 46.7% and 21.7%, respectively. 1.7% of the solutions were left blank. The change in the approach preferences of the pre-service teachers who participated in the designed learning environment in problem solving processes is remarkable. SA, which was the most preferred approach before the implementation, was also preferred in the first place after the implementation. From this point, it is seen that the pre-service teachers' tendency to use SA in synthetic geometry problems continues. Although the preference rates of other approaches have increased, almost half of the pre-service teachers still prefer SA in problem solving. This may be thought to be due to the fact that they have difficulties in the process of adapting to a new situation for them. Because accepting and adapting to a new situation is accepted as a process that requires a long time. For this reason, it is thought that although the practices in the environment were continued for a period of time, this period could not have a sufficient effect on the problem solving behaviors of the individuals. It was also found that efforts to encourage the use of other approaches had short-term effects. When another problem was encountered, most of the solutions were made by preferring SA. A similar situation is observed in the study of Gagatsis and Demetriadou (2001). In this study, it was concluded that classical geometry (synthetic geometry), which is generally used in high school geometry courses in other countries, had a strong influence on Greek students' preferences in geometry problem solving. Allendoerfer (1969) also emphasizes the tendency towards traditional geometry (synthetic geometry) in his study. Nissen (2000) examined the situations in which different approaches were used in geometry problem solving and found that SA was the most widely known and used approach by students. On the other hand, in the interviews conducted, it is another remarkable situation that some students see SA as the starting point for solving with AA and VA. One pre-

service teacher stated that the prerequisite for solving the problem with AA or VA was to have solved the problem with SA. It was observed that some pre-service teachers who stated that they could use other approaches based on the synthetic solution were able to transfer their knowledge in SA to AA and VA. However, on the contrary, it is a fact that there are problems in transferring the knowledge in AA or VA to SA in the problem solving process. In this context, it reveals the idea that the designed environment is insufficient at the point of transferring knowledge between approaches.

The small difference between the preference rates of AA and VA before the implementation increased in favor of AA after the implementation. One of the reasons underlying the increase in AA, which was the least preferred approach before the implementation, is that it is generally sufficient to use simple knowledge in the analytical solutions of the problems used. It was also determined that there were opinions supporting this situation in the interviews. In particular, the number of pre-service teachers who prefer this approach because it gives short results is quite high. Considering the preference rate of AA, it is thought that the designed learning environment contributed to the behavior of using it at the desired level in the problem solving process. After the implementation, it is seen that the least preferred approach is VA. Although the vector solutions of the problems generally require a basic level of knowledge, it is seen that the development of pre-service teachers in VA is resistant. It is thought that this resistance is generally due to the experiences of pre-service teachers in problem solving processes throughout their education. In addition, it can also be said that pre-service teachers prefer VA in the last place due to the limited number of problems solved in the designed learning environment or the fact that the solutions in VA usually involve higher level reasoning skills. On the other hand, it is thought that the experiences in the learning environment also have an effect on the preference for this approach. While the pre-service teachers used VA in the implementations in the designed environment, they had problems especially in the part of constructing a geometric shape by means of vectors. Due to the fact that this deficiency could not be avoided, pre-service teachers hesitated to use VA, especially in problems where geometric shapes should be used for the solution. This situation was effective in the perception of pre-service teachers that it is difficult to use VA in geometry problem solving. A similar situation was found in Kwon's (2012) study. In the study, it was stated that students were reluctant to solve problems with VA because they thought that solving problems with vectors was difficult. In some problem solutions, it was observed that pre-service teachers could not reach the result in solutions where the sum of vectors was used. This process can also be considered as a factor for pre-service teachers not to prefer VA. As a matter of fact, it was revealed in the interviews that the pre-service teachers had an aversion to this approach due to the mistakes they made in the operations with vectors. Gagatsis and Demetriadou (2001) identified similar errors in their study and stated that students preferred VA much less than SA in problem solving due to the errors they made.

The designed learning environment contributed positively to pre-service teachers' geometry achievement. It was determined that the success of the pre-service teachers in the post-test solutions increased considerably compared to the pre-test. It can be thought that using different approaches in geometry problems eliminates the limitation that students experience when using only SY and provides the flexibility to use other approaches when they cannot reach the result with any approach. In this way, students' geometry problem solving success increases. Similar findings have been found in previous studies. These studies (Schoenfeld, 1983; Levav-Waynberg, 2011; Pehlivan, 2011; Kwon, 2012) show that using different ways, strategies or approaches in problem solving increases problem solving skills and success.

Limitations and Future Research
This study aims to examine the effect of the learning environment designed based on AA, SA and VA on pre-service teachers' approach preferences and geometry achievement in solving geometry problems. Although significant findings were obtained, the study has some limitations.

The content of the learning environment designed based on the use of different approaches in geometry problem solving was limited to the axiomatic structure of geometry, triangles, quadrilaterals and circles in the undergraduate geometry course. The reason for this is that SA is the basis of the learning environment design and the alternative solutions of the problems in these topics in the content of the course are shown more easily with AA and VA.

The generalizability of the findings in this study is limited to the problem solutions of 21 pre-service teachers. The reason for this is that the prospective teachers should have some criteria (such as having taken Analytic geometry and Linear Algebra courses before). In addition, in order to be included in the process, the pre-service teachers had to respond to both the pre-test and the post-test. Under these conditions, a total of 21 pre-service teachers were selected as participants.

Another limitation is that the duration of the learning environment was limited to 10 weeks. The geometry course at the undergraduate level lasts 14 weeks in total and data collection processes are added to this process in the

designed learning environment. Therefore, the duration of the designed learning environment was determined in this way.

The learning environment designed within the scope of the research was created by using AA, SA and VA together to enrich the geometry course content in the undergraduate mathematics teaching program. The learning environment designed in this study contributed to the pre-service teachers to utilize different approaches in solving Euclidean geometry problems and to solve the problems successfully. On the other hand, pre-service teachers who participated in this environment had a productive process in transferring knowledge between approaches. In this context, it is recommended that courses with similar content to the learning environment designed in this study should be included in mathematics teacher training programs.

ACKNOWLEDGMENTS

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Protest Music as a Communication Method; Research on Teaching Strange Fruit

Mine SADRAZAM
PhD Student, Girne American University, Faculty of Communication, Department of Media, Kyrenia/TRNC.
Email: minesadrazam@gau.edu.tr

Ümmü BAYRAKTAR
Assoc. Dr. Girne American University, Faculty of Communication, Department of Media, Kyrenia/TRNC.
E-mail: ummubayraktar@gau.edu.tr Orcid: 0000-0002-7415-5035

Abstract
The great economic power of the United States of America allowed its attitude towards the African American population living on its land to be ignored for a long time. However, the lives of the African Americans and the time they have lived have started to manifest itself in music as well as various visual arts. Protest music is written and performed with the aim of encouraging cultural and political change to be a part of the movement. The emergence of protest music in the United States coincides with the period of the Civil Rights' Movement of the 1954's. The protest music, which started with the aim of drawing attention to the elements of war and slavery, was composed and performed with the aim of drawing attention to the racist attacks against black people in South America, shedding light on violence and oppression, and helping the white people face this situation. The jazz style song "Strange Fruit" sung by African American female singer Billie Holiday, which addresses these issues and is considered as one of the first original example of protest music, started a change by creating the intended effect on the white people and African American people living in the United States. The song/poem "Strange Fruit", the photograph that inspired the composition, the photograph and video of Billie Holiday singing the song will be analyzed with Roland Barthes' semiotic theories. The result of this study shows that protest music, performed in the best possible way, is an important and effective element of communication to draw attention to the efforts of African-Americans involved in the construction of a great piece of labor.
Keywords: Education, Communication, Protest Music, Strange Fruit, Billie Holiday, Semiotics.

Introduction

Music is the art of expressing emotions and thoughts through sound and silence. At the same time, music, which is a universal cultural event, meets social, cultural, religious, spiritual and intellectual needs, and it does this by combining melody, harmony, polyphony and rhythm with natural or artificial instruments. According to the Turkish Language Association, music is the art of expressing certain emotions and thoughts with harmonious sounds within the framework of specific rules. While explaining music, Plato says that rhythm and harmony penetrate very deep into the human heart and capture people strongly and that people distinguish between good and evil through music (Plato, BC360). It is seen that throughout history, music has been used as a means of communication by governments and political formations. One of the examples of this situation is the Roman Church in Europe. The music used by the Roman Church in Europe since the Middle Ages was used to support the existing order as a part of the management style in order to legitimize the feudal order. The Kings and Lords who lived in this period used music as a complementary element and a means of communication in managing the masses they claimed to "protect", using legal oppression and sword power (Solmaz and Başevli, 2005). It is seen that administrators and politicians understand the impact of music on people, benefit from its power to influence/unite, and support musicians by rewarding them when they perform and compose works that emphasize their power. Another feature of music is its ability to unite the masses. Since music has a broad reach and impact, it is one of the fastest and most effective ways to share the intended message and reach target audiences.

Protest music is used during social and political unrest when disappointments are experienced; expectations are not realized, mass demonstrations occur, the masses begin to act together, and in situations requiring collective action and participation (Vandagriff, 2015). It is thought that one of the essential reasons for the popularity of protest music today and the increase in its audience is the role played by the musician. Author Fran Lebowitz talks about the importance of music for people in her comment about musicians in the documentary Pretend It is a City (S1: E2 "Cultural Affairs") series broadcast on Netflix, and states that music and musicians leave a mark on people's memories. Therefore, the person who plays a role in creating these memories explains that musicians are loved regardless of their personalities and who they are. This critical role of musicians on people is also influential in protest music. The populism of the artist, his commitment to a possible cause, and his motivation in the face of the current situation are accepted by his listeners and play an important role. All of these increase the composer and performer's value in the masses' eyes, and the music they perform attracts more attention. This article is about

the song "Strange Fruit", performed by African-American female singer Billie Holiday in the United States from 1939 until she died in 1944. This work started a new movement in protest music in the United States. This change, which started at that time, continues to increase in the field of protest music today, and the new style of protest music, starting with "Strage Fruit", reaches large audiences of listeners and viewers.

Method

Music, which starts personally and reaches society, appears before us with the literal and connotative meanings, symbols and metaphors it contains, what it creates in the mind of the person it expresses, and what it makes one feel and think. Roland Barthes showed that since music has all these features, it can be analyzed with semiotic theories so that music can be understood better. Within the framework of the analysis of this article, semiotic theory and musical and non-musical signs will be focused on. After the lyrics of the song "Strange Fruit", which has original lyrics in English, are translated into Turkish, the subject, text analysis and themes used in the lyrics will be explained. In this study, the approaches of Roland Barthes, who explains semiotics systematically, will be used. Barthes' theory of semiotics, which divides it into headings such as signifier, signified and sign, denotation and ideology, will be analyzed and interpreted by analyzing the music and lyrics of "Strange Fruit", meaning, content, body use and audio-visual synchronization and non-musical eleme.

Strange Fruit and Semiotics Analysis

Billie Holiday's song " Strange Fruit " is the first example of protest music in the United States, which began to reach a broad audience with record players and radios that began to become widespread in the 1930s, is Billie Holiday's song "Strange Fruit". Billie Holiday it released one of her most famous songs, Strange Fruit, on April 20, 1939. "Strange Fruit", recorded with an 8-piece African-American orchestra, reached a wider audience over time and became the 20th studio album. It will become a work that marks the century.

Music critic Dorian Lynskey describes in his book" Revolutions per Minute: A History of Protest Songs, from Billie Holiday to Green Day "that "Holiday's song" Strange Fruit" is the first of its kind". "Strange Fruit" has added protest songs to the world of popular music and made a new start. Lynskey comments, "Up to this point, protest songs have served as propaganda, but" Strange Fruit" has proven that it can be art" (Lynsky, 2011).

"Strange Fruit" is a song performed by Billie Holiday with a silky voice, dark, depressed melody, and moody lyrics. Jewish teacher Abel Meeropol, a member of the American Communist Party, published "Bitter Fruit" as a poem in the publication of The New York Teacher in 1937. Meeropol was impressed by the lynching scene that photographer Beitler made him record, saying, "It was a shocking photo, and it stayed in my mind for days. As a result, he said," I wrote 'Strange Fruit' as a poem," and he later composed the lyrics himself (Moore, 1876).

Roland G. The photographs examined through the concepts of Studium and Punctum, which Barthes included in Camera Lucida, not only take a photo out of its frame but also analyze it from a historical, cultural, sociological, psychological point of view, but also analyze it with the elements of the person who looks at the photo and establishes a relationship. Studium, a Latin word that means study-learning, conveys photography to analyze it through codes. Barthes Studium defines it as an ordinary analysis of the feelings, thoughts, and cultural codes left by the person looking at the photo. For this reason, a photo frame also creates a documentary image in the viewer. In Camera Lucida, he gives photography as an example for a clearer understanding of the Stadium. Here, Barthes states that the photo taken by the photographer was taken as a news story to detail an event, provide information or provide evidence and was limited to these areas. The person who examines the photo is expected to provide a comment only intellectually or emotionally. However, although the impressionable photograph is impressive, it is not expected to arouse curiosity and eliminate its stasis by going beyond time (Barthes, 2016; Özinan, 2021).

The first performance of the song took place in Greenwich Village in 1939. Meeropol, Billie Holiday's comment; "He fulfilled the requirement of his style. It's pathetic and a shocking quality that I hoped the song would have," he commented. Billie Holiday commented on the first day she performed the song; "There wasn't even a single clap at the end of the song, then one person started clapping nervously, and then suddenly everyone started clapping". Within a short period," Strange Fruit "started to have a big impact, and people started coming to Café Society, where Billie Holiday was performing, just to listen to the song" Strange Fruit" (Amaoko, 2019).

It was not only the political nature of the song that surprised and touched the listeners but also how Billie Holiday unforgettably performed it. In her book Black Resonance: Iconic Female Singers and African American Literature, Lordi argues that this is the result of Holiday's choices and tells BBC Culture that When Billie Holiday performs the song, she points out how striking the lyrics are. His syllables and the accents he makes evoke a feeling of anger caused by the way he cuts words. All this shows that there is a deep and sad quality in Holiday's performance (Amoako, 2019).

When we examine the video and picture images of Billie Holiday singing the song, we get the impression that terrible violence is happening in front of her eyes at that moment. By portraying the event, the song, which she interprets as if she were seeing and living at that moment, draws a profile of a young black woman who is even incapable of standing but is so upright, courageous and brave. Billie Holiday's interpretation of the song with such sincerity and feeling allows the listener to experience the event with the support of the lyrics and to reveal the suffering in front of their eyes. Billie Holiday's song interpretation allows her to get ahead of other performers. "Strange Fruit" is a work of art, not a hymn and folk song melody, far from the style of propaganda and early protest music. The power of believability, emphasized by Roland Barthes, manifests itself here. The video and photo of Billie Holiday singing the song and the choices she made in an authentic minimalist aesthetic reveal her persuasiveness and reality, and this situation is understood and appreciated by the listener and viewer.

"Strange Fruit" is still played, sung and performed by many jazz musicians today. The song maintained its success in the early years. It continues to be watched and listened to by millions of people on YouTube and similar social media channels due to the widespread use of the Internet. We can interpret one of the main reasons why the song continues to be popular years later as the fact that racism, violence, and cruelty continue, even though we do not see the scenes of lynching by hanging, even 80 years after the year the song was written (Amoako, 2019).

The poem "Strange Fruit" consists of three continents. There are four lines within each continent. The poem is written in the AABB rhyme scheme, and this order continues on all continents throughout the poem. The rhyme scheme of a quatrain is revealed by looking at the last sounds of the verses. Accordingly, the song" Strange Fruit" rhyme scheme follows the plain rhyme scheme. The "fruit" in the first verse is written in rhyme with the "root" in the second verse.

In the same way," breeze "and" trees" rhyme. On the second continent, "South", "mouth", "fresh", "flesh", and on the third continent ", puck", and "suck", "drop" and "crop" are written in rhyme. The poet limited the poem to 3 continents without too much ado and tried to make his argument strong without repeating the exact words as if he wanted to emphasize the importance he attached to each word. In addition, the absence of the chorus part that we see in many songs in the song" Strange Fruit" is quite noticeable. No second repetition of any remark was made. It brings to mind the idea that the lack of rhythm in the first continent of the poem was explicitly chosen to emphasize the "strangeness" of the situation. In the sub-continents, we see that poetry is exceptionally smooth in terms of rhyme, and even poetry is adapted to a mechanical pattern. This situation emphasises syllables, the mood and the tone of the poem in the foreground (Corfman, 2016).

With Strange Fruit, instead of music performed by a few musicians with simple and familiar melodies, a complicated musical structure, a plural number of musicians, and a type of music that directly criticizes politics with metaphors rather than direct lyrics have emerged. "Strange Fruit" is a song that warns people about the country's state. It was composed to draw people's attention to the events and the violence and turmoil in the lynching incidents in South America. Although the lyrics were written based on an actual event, the lyrics did not include the murder of a black body by hanging. It is thought that the most important reason for this is that the song "Strange Fruit" is the first original protest music of the period.

For this reason, the desired message is hidden with metaphors. Although the events were not conveyed, "Strange Fruit" was very effective and enabled people to empathize with the event that happened and was conveyed in the song. Billie Holiday's role in performing the song allowed her to portray the event with metaphors in the audience's minds. It allowed them to create empathy about the situation, that is, to connect. All this clarifies the principles of Roland Barthes" the more convincing, the more realistic'.

"Southern trees" is a metaphor and is thought to refer to white people living in South America. On the other hand, the tree symbolizes "hatred against blacks" in addition to representing whites. "Strange Fruit" is another metaphor in this poem and refers to dead and alive black people. In this line, which is" blood on the leaves and blood at the root", there are two separate metaphors. The "leaves" and "roots" of the tree refer to the blood-soaked hands of white Americans and their vengeful heart. Other examples of metaphors in poetry are reserved for using the term "southern breeze". The metaphor in which black bodies are used as "fruit" juxtaposes the concept of fruit, which many love, with something completely reversed and distorted, creating the illusion that a natural and beautiful image of fruits waving in a warm southern breeze is imaginable. However, the reality here is entirely different and is nothing more than black bodies depicted as "fruit" (Corfman, 2016).

Music Analysis of Strange Fruit

"Strange Fruit" is performed by the performers at different tempos. Billie Holiday's performance is a slow and heavy tempo in the style of a funeral anthem. The song, performed in the tone of B flat minor, begins

homophonically with the piano repeating minor chords of the same tone while Billie Holiday sings the lyrics. While the piano plays the song lower and quieter, Billie Holiday's voice is more precise and robust to adapt to the environment. This situation brings the song's lyrics to the forefront, ensuring that the Decrees and the desired message are not ignored. Imik and Poppy (2020), in their article titled' Where is Music in Our Life', "In general terms, the concept of music consists of sound, rhythm, melody and harmony components. In order to improve the quality of comments, it is necessary to add nuances. On the other hand, the use of nuance, a sine qua non, such as salt, pepper and spices of the dish, conveys the part of the work that adds strength to the impressive and power, making the desired emotion and meaning effective."

Music is a cultural event; music in minor tones is perceived as sad and emotional in Anatolia, Europe and the United States. Billie Holiday emphasizes the parts she wants to stand out in the lyrics while singing the song, and at the same time, impresses her audience with facial expressions (TheK9chief, 2017). This Decelerating tempo and homophonic relationship between Billie Holiday and the pianist continues throughout the song, which is set in a melancholic mood. This ensures that the listener follows the song and its lyrics carefully and does not miss anything. The "refrain" part, found in many songs, is not included in "Strange Fruit". The absence of a chorus part also musically adds a separate feature to the song. The most significant change in the song happens at the end of the song. Immediately after the last words, we can hear the woodwind instruments starting to play in the background during the last beat of the song. This sudden rise in music is interpreted as a simultaneous final cry and a protest movement by the instruments and the silence that occurs at once (Drees, 2016).

Conclusion and recommendations

A person resorts to many ways to express himself and Decrees branches of art among the ways he uses. Works of art convey the desired message, sometimes clearly and sometimes using metaphors and side meanings, aiming to bring a different perspective on feelings and thoughts, highlighting the points where speech and language are insufficient and need to be supported.

Music is a social and personal product with the melodies and rhythms used. Music and musical indicators are also used as representative social and political expression tools, create societal awareness and lead to change. Protest music brings the masses together with feelings, thoughts, goals and similar goals, enables them to act Decently and contributes to the formation of awareness. Billie Holiday, who comes from the black culture in the United States, has had to struggle with many difficulties to perform "Strange Fruit", but she is an influential artist who has dedicated herself to making the voice of her people, problems and experiences,, heard through her art, has made a difference and has therefore managed to write her name in golden letters in the history of protest music. The movement started by Billie Holiday has been inspiring many artists by growing day by day. Protest music has formed an essential part of the change by reaching out to the masses from different cultures by addressing many issues such as political and social problems, injustice, police violence, racism, discrimination, and feminization, taking on a role encouraging resistance to cruelty and violence alongside the oppressed, supporting social messages with words and music, manifesting itself in different musical styles.

Billie Holiday performed" Strange Fruit" with her silky voice and delivered the song, composed with a dark and depressing melody, to her listeners with the accents she made to the lyrics and the emotion she added. Moreover, she successfully performed the song by taking an essential stance as a black woman. After all this time since the composition of" Strange Fruit", its lyrics, music, and Billie Holiday's unique interpretation of the song have allowed the birth of protest music in a new style in the United States and have managed to make it clear that music is an undeniable means of communication when it contains the necessary and correct messages and is used in the right way. "Strange Fruit" still occupies an important place today. Protest music, composed and performed to draw attention to racist attacks, spotlighting violence and persecution and ensuring that white people face this situation, has become an essential and practical communication element today.

Roland Barthes made it possible to analyze music, photography, video, body use and audio-visual synchronizations with semiotics. Thanks to the concepts of Studium and Puntium, flat and burning, which Roland Barthes added to semiotics, a photo has ceased to be just a frame, a video is a meaningless visual, and music consists of sheet music; they have become concepts that can be analyzed from historical, psychological and cultural aspects and become reality.

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The Contribution of the New Media to the Public Opinion Formation Process in the Turkish Republics and its Place in Education

Hikmet EREN
PhD Student, Girne American University, Faculty of Communication, Department of Press and Publication, Kyrenia/ TRNC.
E-mail: hikmeteren@gau.edu.tr

Muharrem ÖZDEMİR
Asst. Prof. Dr., Girne American University, Faculty of Communication, Department of Press and Publication, Kyrenia/ TRNC.
E-mail: muharremozdemir@gau.edu.tr
Orcid: 0000-0003-1570-146X

Abstract
With the development of computer and internet technologies, new media has become indispensable to daily life in the digital age. The concept of public opinion, which is at the centre of many research topics in the field of communication, has also interacted with new media in this context. Thus, new media tools have begun to be seen as critical elements in the processes of public opinion formation. This study aims to investigate how new media affects public opinion formation processes in the Turkish Republic and to contribute to the relevant literature. The most important result of the study is that in the postmodern age, new media is one of the dominant elements that direct the thoughts and attitudes of individuals in the public opinion formation processes. Another critical finding in the study is that the use of new media in the Turkic Republics increases yearly. In this context, digital diplomacy has begun to be used more intensively among member countries. Finally, in the current conjuncture, new media has a strategic importance in disseminating propaganda materials, and young people in the Turkish Republic are the segment of society that uses new media most actively in public opinion formation processes.
Keywords: Digital Diplomacy, Forming Public Opinion, Social Media, Turkic Republics, New Media.

Introduction
For the Turkish Republic, the media has gone through many different phases from the Tsarist Russia period to the 21st century and has fulfilled various functions under the control of various powers. In this context, according to Temir (2021), it is possible to examine the functions of the media in the period from Tsarist Russia to the present day, on the axis of the Turkish Republics, in three phases chronologically: the Tsarist Russia period, the Union of Soviet Socialist Republics period and the post-independence period. However, in this study, the post-independence period, which started after the dissolution of the USSR in 1991, will be discussed rather than the first two periods because the relevant period is the intersection of the emergence of new media and the independence of the Turkish Republics with the dissolution of the USSR.

Mass media and new media can direct the thoughts and attitudes of society and individuals. In this respect, new media is one of the most effective elements in forming public opinion in the digital age. However, each society has its own media consumption practice, which develops depending on many parameters such as freedom of information, digital maturity level of the country, national mentality, internet speed, and historical and spiritual values. For example, according to Imamova (2011), one of the most critical problems faced by the people of Central Asia is the lack of access to accurate, reliable news closely related to their lives because the regimes tightly suppress the media. Therefore, there is an increasing need for non-governmental press and electronic media elements by consumers in the Central Asian geography.

The agenda of the media mainly constitutes the agenda of the public. Popular social media platforms such as Twitter (X) and Facebook (Meta), which have large user bases, especially in Turkey and the world, serve as newspapers as well as being used for entertainment purposes (Durmuş and Gezgin, 2020). This is an essential function for social media platforms because two-way communication increases the pressure of new media on conventional media and affects the agenda-setting process of traditional media. In this study, from a dialectical perspective, the effect of new media on public opinion formation in the Turkish Republic and the position taken by conventional media in the relevant process have been examined.

Public Opinion, New Media and Education
Although the concept of public opinion is a concept that is at the centre of many issues in the field of communication, there is no standard definition of the concept of public opinion that everyone agrees on. There are many definitions of this concept in the literature. In this respect, the notion of public opinion is at the top of the

list of concepts waiting to be explained. According to Gökçe (1996), it is possible to discuss the studies on defining the concept of public opinion in two main groups: The definition of the concept of public opinion within the framework of political science and the definition of the notion of public opinion in terms of other social sciences. In the eyes of political scientists, public opinion is depicted as the norm that determines the action plan of the legislative, executive and judicial bodies of the state, which is described as the separation of powers or is created by opinion leaders in other fields of social sciences, the understanding of public opinion is that the person's views, behaviours, business and private life are within the individual. It is related to the opinions and attitudes of the society in which it lives. In this context, the definition of public opinion varies according to how it is handled from a political and individual perspective, as stated above.

While well-established communication theories are discussed together with mass media, and the effects of conventional media on people in the process of forming public opinion are intensively investigated, there are not enough studies in the literature on how valid the relevant theories are in digital media environments in the digital age we are in (Koç, 2020). However, when traditional mass media have begun to lose their relative effectiveness and internet-based information technologies have become increasingly widespread, it does not seem possible to consider the concept of public opinion independently of new media. In this context, while researching issues related to public opinion formation and digital diplomacy, considering what impact new media can have on these processes will make it possible to approach the concept of public opinion formation from a more holistic and broader perspective.

With the development of computers in the 1950s, the foundations of the Internet were laid, and accordingly, communication technologies entered the process of rapid digitization in the 1960s and 70s. In 1989, the Internet became available to the public and took its current form. These critical developments in the field of informatics paved the way for the emergence of the concept of new media, and in fact, the concept of new media first emerged in the 1970s. However, there are also studies in the literature that date the emergence of new media to earlier periods in the historical process. For example, he dates the birth of new media back to the 1830s. According to Manovich (2011), new media represents the convergence of computing and media technologies because Manovich argues that computing and media technologies started with Charles Babbage's Analytical Engine and Louis Daguerre's Daguerreotype. In addition, it is possible further to diversify the definitions of new media in the literature. For example, according to Liewrouw and Livingstone (2020), new media includes social contexts related to information technologies, inventions and devices that increase the communication capabilities of individuals/institutions, communication activities organized using these devices, practices developed to convey information, and social regulation shaped around new media tools. Or organizations. According to Binark (2007), since all digital devices and applications such as the Internet, computers, smart mobile phones, PDAs, game consoles and the like have now become a part of the body, the concept of new media, which includes all these technologies, has become a part of the routines and societies of people/societies. It is a phenomenon that transforms daily life practices. In short, although there are different opinions about the emergence and definitions of new media in the literature, the concept of new media essentially gained importance as computers, the Internet, and information technologies began to be integrated into the field of communication from the last quarter of the 20th century to the present day. In addition, when we look at the progress of new media, it is seen that it is a mixed media type because new media is directly connected to many other communication channels such as computer technologies, communication, telecommunications and publishing, as briefly mentioned above.

The Relationship between New Media and Education in Terms of Their Importance in Forming Public Opinion and Digital Public Diplomacy

Daily life is an area where fundamental values and principles are legitimized in terms of social organization, where common values are shared or rejected by individuals forming various segments of society, and where ideologies, which are the whole of thoughts that form a political and social doctrine, become public, that is, become known to everyone (Büyükbaykal and Yanmıyan, 2018). It is a known fact that ideologies, which can therefore be considered an extension of people's daily routines socioeconomic and sociocultural practices, surround the lives of individuals in many aspects. Therefore, various ideologies that affect daily life are imposed on society by political and economic authorities through media and advertisements. In this context, new media environments are among the first channels that come to mind that can be used to influence, direct people, and create public opinion because new media is a constantly active world. People interact with each other at all times in new media environments. Rushkoff (2018) defines this state as being online and, in parallel, states that the digital age has ten important features: time, space, dimension, identity, choice, purpose, accuracy, openness, confusion and socialization. In addition, he states that he sees computers and networks as living entities rather than tools and that such technologies will be the dominant element in characterizing the future of how people live and work. In summary, according to Rushkoff, it is possible to program people in societies that interact with each other, primarily through new communication technologies due to the digital revolution. Therefore, in digitalized public diplomacy, where

creating public opinion is the primary goal, new media tools seem to be the ideal tools that governments can use to obtain public consent on any issue, persuade the public, or program people according to their interests.

The emergence of new media-based digital public diplomacy indicates that traditional diplomacy is no longer seen as the only form of diplomacy in international relations in the postmodern era. For example, in the report titled Turkish World 2040 Vision, direct support is given to productions such as television series, films, digital content, animations and documentaries that draw attention to the shared history, culture and values of the member countries, establishment of joint production companies and R&D units to expand the target audience, and new artificial intelligence-based innovations. Some plans include focusing on media activities and establishing entrepreneurship centres for digital media. In this context, it is understood that the Organization of Turkish States aims to benefit from traditional diplomacy and new media-based digital diplomacy to the maximum extent, as mentioned above. New media platforms, which have become the most critical mass communication tools of the 21st century, have the power to determine individuals' thoughts and behaviours on many issues. In other words, new media has the potential to influence and direct societies significantly. The power behind the new media's influence on society is the internet because it has led to the formation of a virtual public space in the information age, and, at the last point, it has begun to be seen as the most critical element that mobilizes large masses. In this context, the internet and new media have created the necessary infrastructure for the formation of the network society and have become the agora of the network society in social media (Durmuş and Gezgin, 2020). New media includes the internet context and all types of media that allow digital content to be carried and transferred to other users. Therefore, new media has radically changed the perspective of forming public opinion. The social actions and digital activism movements that have taken place in Turkey and various other countries in recent years prove this.

In summary, the development and popularization of the Web in parallel with the Internet has brought new media platforms to the fore. As the use of new media became more widespread, people began to express their problems and reactions in new media channels. In this context, new media has allowed individuals to create public spaces and determine their agendas. In addition, due to its features, new media has also begun to function as an organizational area in organizing social movements. In this respect, it has become the starting point of public opinion formation processes as an instrument that paves the way for social interaction.

The Role of New Media in the Public Opinion Formation Process in Turkish Republics
With the introduction of new media into the field of communication, developments such as the ability of people to instantly communicate with anyone on the other side of the world via the internet, to follow events and news in various countries daily, and so on, have accelerated the interaction of different cultures. In this context, it has become more accessible for people from different cultures with different backgrounds, experiences and views to come together, get to know each other better, and discover their differences and similarities. In other words, new media has paved the way for the fusion of different cultures and accelerated international interaction in many aspects. Considering the historical ties between Turkey and the peoples of related Turkic-speaking states in the Caucasus and Central Asia, new media can accelerate the integration mentioned above process.

The Caucasus and Central Asia are strategically some of the most critical subsystems in the world. There have been many conflicts in both regions from ancient times until today. Moreover, this conflict potential still maintains its warmth today (Akıncı and Kaba, 2023). Therefore, the new media is essential in establishing peace in these regions, ensuring stability, increasing security, strengthening mutual trust, achieving consensus in shared interests and creating public opinion in the Turkish Republic. For example, the foreign policy understanding of each of the states in the South Caucasus region, called Transcaucasia by the USSR, is quite different from each other, and in this context, Azerbaijan and Turkey; Armenia to Russia; Georgia, on the other hand, feels closeness towards the USA (Yılmaz, 2006; Yılmaz, 2018.

Many countries worldwide have used the media to convince people in other countries of the superiority of their systems. For example, the Soviets used international broadcasting to introduce the ideology of communism to the world and establish a global network. Similarly, the USA established the Voice of America (VOA), which produces digital, television and radio content in more than 45 languages to reflect the American perspective on international issues and introduce other nations to its political system and culture. VOA, a multimedia broadcaster founded by the U.S. Government in 1942 to counter Nazi propaganda, provides news, information and cultural programming via the internet, mobile media, social media, radio and television to an estimated weekly global audience of over 326 million. As can be understood from this information, new media is the most essential communication tool states use in the digital age to pressure other states and societies and create public opinion. The USA started to work to create public opinion in its favour in this geography approximately 70-75 years ago by making radio programs in Central Asia through VOA in the 1950s (Imamova, 2011). From this point on, when we look at the studies carried out in Turkey, it is stated that the TRT-INT channel, established in 1990, was the

first television channel broadcasting cross-border in the country and that the purpose of the establishment of the channel was to prevent the weakening of the ties between citizens living in Europe and Turkey. In addition, TRT's first broadcast for the Caucasus and Central Asian Turkish Republics was with the TRT-Eurasia channel, which was established in 1993.

On the other hand, "www.trtvotworld.com" was launched in 2008, and content in 41 languages started being presented to the world public. In this context, TRT became the fifth largest broadcasting company in the world among the broadcasters in the new media service environment. TRT-Avaz channel was established in 2009 in order to appeal to a population of approximately 250 million in 27 countries and 13 autonomous republics and started broadcasting in Turkish, Azerbaijani, Kazakh, Kyrgyz, Uzbek and Turkmen (TRT). In summary, by taking advantage of the opportunities offered by the new media, TRT has served as a bridge in both creating public opinion and implementing Turkish foreign policy in these countries by bringing the Central Asian Turkic Republics and Azerbaijan, which have a common language, social memory and culture with Turkey, closer together.

Studies in communication-related disciplines in the former Soviet republics of Central Asia have increased significantly compared to the pre-1991 period because while most of the region was off-limits to Western academics and other researchers during the Soviet period, after the collapse of the USSR, more communicators and media researchers had the opportunity to conduct research in this geography. Has achieved (Freedman, 2011). In this study, an evaluation was made on the impact of new media on public opinion formation processes in five Turkish Republics (Azerbaijan, Kazakhstan, Kyrgyzstan, Uzbekistan, Turkmenistan) that gained independence after the collapse of the Soviets.

Azerbaijan
The 2nd Karabakh War, which took place between Azerbaijan and Armenia in 2020 and lasted 44 days, found comprehensive coverage in both the national media of the two countries and the international media. So much so that social media and other cyber channels have become the continuation of the physical battlefield in the digital environment since September 27, 2020, when the war started. Therefore, the 2nd Karabakh War was not only a physical conflict but also moved to new media platforms among the information sources of the parties. In this context, the Armenian and Russian media shared anti-Turkey posts on social media and other online networks through terms such as Pan-Turkism, Neo-Ottomanism and discourses such as Turkey's increasing influence in the Caucasus, thus creating public opinion against Turkey in the international arena, especially in the Armenian and Russian communities. They tried to create it (Kırdemir, 2021).

On the other hand, Turkey provided open diplomatic support to Azerbaijan in the Second Karabakh War and carried out public opinion-raising activities in Turkey and Azerbaijan, other Turkic Republics and internationally, primarily through various new media platforms. These new media-based public opinion formation efforts bore fruit during the war, and especially as a result of social media sharing, the consciousness of one nation, two states, and brother country consciousness came to the fore in the public opinion of Azerbaijan and Turkey as never before. On the Armenian side, the trust in Russia has been shaken significantly (Yerevan, AFP). The idea that the security policies based on the Collective Security Treaty Organization should be reconsidered after the war has become widespread in the Armenian public. The Armenian government even demanded that the Armenian government withdraw from the CSTO as soon as possible.

There have been social movements demanding In this context, the Speaker of the Armenian National Assembly, Alen Simonyan, and the Chairman of the Armenian Security Council, Armen Grigoryan, also clearly emphasized that the CSTO alliance did not meet Armenia's expectations (Ghulinyan and Gerz, 2022). Various sociological studies conducted by the Caucasus Research Resource Center Armenia show that in 2011, 81% of Armenians saw Russia as their closest friendly country. However, this rate is 35% in 2022, which is historically high. It is seen that the rate of Armenians who see France as their closest friend has decreased to a low level, and on the other hand, the rate of Armenians who see France as their closest friend has increased from 7% in 2011 to 36% in 2022 (CIVILNET). According to the Turkey Trends Research 2022 report findings, 54.8% of the Turkish people see Azerbaijan as the most reliable partner, close friend and brother country for Turkey (Aydın et al., 89). On the other hand, according to the Stockholm International Peace Research Institute data, Azerbaijan and Armenia meet more than 80% of their total arms imports from Russia. However, by frequently expressing on new media platforms that it is very disturbed by Russia, which it sees as its closest ally in the recent past, selling weapons to Azerbaijan, Armenia is trying to create a public opinion on this issue in both Armenia and Russia, thus trying to prevent Azerbaijan from supplying arms from Russia. Is working. In this context, it is possible to say that new media is used as a tool of pressure on societies to protect the interests of countries. During the 2nd Karabakh War, Twitter

was one of the parties' most frequently used new media channels to create a specific public opinion and perception. In this context, Turkey, Azerbaijan and Armenia used Twitter as soft power.

Kazakhstan

After Kazakhstan declared its independence, significant changes occurred in the media structure of Kazakhstan. According to Kazakh political scientist Nurtazina (cited in Han, 2020), it is possible to talk about two important factors behind these changes in the Kazakhstan media. The first is social changes in Kazakhstan society, and the second is the commercialization of the media, which the government monopolizes, and innovative developments that require radical changes in the media typology.

Kyrgyzstan

As a result of the positive developments in Kyrgyzstan, after it gained independence, Western policymakers and academics presented Kyrgyzstan as the democratic island of Central Asia because Kyrgyzstan was a country that adopted a more open politics and pluralistic democracy than its neighbours in the 1990s (Anderson, 1999). Although the fact that Askar Akayev, the first president of Kyrgyzstan, who took office after the dissolution of the USSR, was a leader who emphasized democratization, the rule of law, marketization and the importance of the media, was influential in showing Kyrgyzstan as an island of democracy in Central Asia, Akayev did not take part in the Tulip Meeting held in 2005. As a result of the revolution, he was removed from his post and replaced by Kurmanbek Bakiyev. From Bingöl (2018) perspective, Kyrgyzstan is the most democratic of the Central Asian republics, and therefore, explaining the Tulip Revolution solely through the rhetoric of democracy and freedom is insufficient to make sense of what happened because geo-cultural factors play an essential role behind this revolution. In this context, The key to the Tulip Revolution is the global competition between the ADB, China and Russia. If we need to evaluate these events in Kyrgyzstan in the context of new media, The reflection of the anti-Akayev protests in the media, especially on television, triggered large-scale public debates in the country. Thus, the media enabled the opposition parties and the Kyrgyzstan public to support the anti-Akayev demonstrations more substantially.

Moreover, according to Bingöl (2018), what happened in Kyrgyzstan due to Akayev not following a policy in line with the expectations of the USA is not surprising. In this context, it is possible to infer from Bingöl's comment that the USA may have supported the creation of an anti-Akayev public opinion in the country through new media tools. In summary, it is seen that the media played an essential role in the events that took place in Kyrgyzstan in the post-independence period, and it is understood that the new media was especially effective in removing Akayev and Bakiyev from power.

Uzbekistan

Uzbekistan is the most populous country in the region, with a population that constitutes almost half of the total population in Central Asia. According to Imamova (2011), although Western media organizations can only reach 4% of media consumers in the country, they still need help maintaining their readership, listeners and audience in Uzbekistan. Imamova also states that foreign media organizations operating in Uzbekistan generally need help continuing their publishing activities due to a lack of resources and that national multimedia companies are in a stronger position than foreign media organizations. In addition, according to the latest data, over 1500 mass media organizations and channels are operating in Uzbekistan, one of the largest media markets in Central Asia (TIKA). A study on media consumption and literacy was conducted by the US Agency for International Development in 2019 in Uzbekistan with a sample group of 1,000 people. It was found that television was the most popular media in Uzbekistan, and 82.6% of the participants used a mobile phone or smartphone to communicate with other people. It was concluded that they use phones, 45% do not follow the print media, 40.6% read news online, and 36% read magazines and newspapers in digital format.

Turkmenistan

Turkmenistan is considered one of the most mysterious countries in the world. According to Schmitz and Volters, citizens' access to independent news sources in Turkmenistan is minimal, and the technical tools necessary for the public to organize in situations that concern the public are also minimal.

In 2020, it was decided to create a strategy to switch newspapers and magazines from paper to digital in Turkmenistan. This initiative, which seems logical at first glance, could not achieve the expected efficiency when it came to implementation due to the country's weak internet infrastructure. Worse than that, it caused people with limited access to the internet, living in rural areas, and without a smartphone or computer to become even more disconnected from the media (Jamartov, 2021). According to the IREX Media Sustainability Index, the media in Turkmenistan is seen as far from its purpose of informing citizens or creating an environment for public debate on important issues in the country, and a separate report also states that media organizations and digital platforms in

Turkmenistan do not have preventive mechanisms to control content to reduce disinformation. Emphasis is placed. However, in addition to all these negativities, new media also supports the formation of public opinion in Uzbekistan on various issues. In this context, to give an example of the impact of new media on the public opinion formation process in Turkmenistan, the term coronavirus was the most searched word in Turkmenistan, according to Google Trends data, during the period when the government started to take preventive measures in the Covid-19 pandemic (Jamartov, 2021). In this context, social media mediated the formation of public opinion about taking the necessary measures against the COVID-19 epidemic in Turkmenistan during the pandemic period.

Conclusion and recommendations

In terms of its features, new media allows individuals to create agendas and influence traditional media. Thus, the power of forming public opinion is shifting from conventional to new media. Significant global developments such as pandemics, wars and other social movements in recent years are accelerating structural changes towards more digital, mobile and platform-oriented media environments. Therefore, in the digital age, new media channels are becoming the most suitable medium for disseminating propaganda materials and educating individuals in public opinion formation. In this context, digital diplomacy has begun to be used more intensively in international relations between the Organization of Turkic States member countries. As a result, in the postmodern age, new media is one of the most critical mass media tools that direct the thoughts and behaviours of societies in the processes of public opinion, and the use of new media in the Turkish Republic is becoming increasingly widespread, especially among young people. In this context, new media is of strategic importance as a propaganda tool in the public opinion formation processes in the Turkish Republic in terms of correctly directing the society in general and especially the young population.

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The Development of Augmented Reality Media on Thai Rice Products for Upper Secondary Level (Grades 10-12)

Wasan WATKRAW
Learning Technology and Innovation Division, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi, Pathum Thani, 12110, Thailand
wasan_w@mail.rmutt.ac.th
ORCID:0009-0003-4666-8751

Thosporn SANGSAWANG*(Corresponding author)
Educational Technology and Communications Division, Faculty of Technical Education, Rajamangala University of Technology Thanyaburi, Pathum Thani, 12110, Thailand
sthosporn@rmutt.ac.th
ORCID:0000-0002-7926-6949

ABSTRACT
The objectives of this study were to: 1) investigate the efficiency of an augmented reality media on Thai rice products for upper secondary level (Grades 10-12) students in Pathum Thani province, 2) compare students' achievements before and after learning through the augmented reality media on Thai rice products for upper secondary level (Grades 10-12) students in Pathum Thani province, and 3) examine student satisfaction towards the augmented reality media on Thai rice products for upper secondary level (Grades 10-12) students in Pathum Thani province. The sample comprised 30 Secondary 4 (Grade 10) students at Dipangkorn Wittayapat (Mattayomwathatasankaset) School under the Secondary Education Service Area Office Pathum Thani, derived through purposive sampling technique. The instruments used for collecting the data were an augmented reality media on Thai rice products for upper secondary level (Grades 10-12) students in Pathum Thani province, a pretest and a post-test, and a student satisfaction form. The data analysis statistics were percentage, mean, standard deviation, and t-test for the dependent sample. The research findings revealed that the augmented reality media on Thai rice products for upper secondary level (Grades 10-12) students in Pathum Thani province was adequate according to E1/E2 at 82.33/81.67. The students' achievements after learning through the augmented reality media were higher than before learning. The mean and standard deviation before learning were 8.77 and 2.22, while the mean and standard deviation after education were 16.33 and 1.45. The t-test score used before and after schooling was 20.96 at a statistically significance level of .05. Moreover, the student satisfaction towards the augmented reality media on Thai rice products for upper secondary level (Grades 10-12) students in Pathum Thani province was at the high level.
Keywords: Augmented Reality media, Thai rice products, upper secondary level (Grades 10-12)

INTRODUCTION

The "Development of Augmented Reality (AR) Media on Thai Rice Products for Upper Secondary Level: Enhancing Educational Engagement and Promoting Cultural Appreciation" research project combines education, technology, and culture. This chapter establishes the study's historical, economic, and cultural context. The "Development of Augmented Reality Media on Thai Rice Products for Upper Secondary Level: Enhancing Educational Engagement and Promoting Cultural Appreciation" research project combines education, technology, and culture. Project title: "Development of Augmented Reality Media on Thai Rice Products for Upper Secondary Level: Enhancing Educational Engagement and Promoting Cultural Appreciation." This chapter provides the historical, economic, and cultural context for the subject, which is essential. Thailand's rice industry is a cornerstone of its agricultural economy and cultural heritage. Rice cultivation and production have been central to Thailand's identity for millennia. This chapter covers cultivation methods, trade patterns, and how rice supports rural and urban livelihoods. This study promotes Thai food internationally via video, website, app, and AR. The US and Japan hosted the studies. The evaluation forms tested samples' media opinions after integrated media exposure. Participants were primarily satisfied with AR, media content, and usefulness (Kheerajit et al.; N., 2019). The results also demonstrated that integrated media helps promote Thai cuisine enterprises and the Importance of Thai Rice Products to the Economy and Culture.

Rice in Thailand has a lengthy history, cultural and symbolic value, and economic importance. It is deeply ingrained in Thai culture, customs, and cuisine. This section discusses how rice shapes Thai social structures, rituals, and identity. The rise of digital technology has transformed schooling. Modern, dynamic, and interactive classrooms have replaced chalkboards and blackboards. This section discusses educational technology

advancements and their use in pedagogy. This awareness can improve technology-rich learning environments' pedagogical design and understanding of visual and interactional behaviors (Jakonen et al.; H., 2021). By offering context, it prepares Augmented Reality as a cutting-edge educational tool. This thesis seeks to comprehend technology, education, and cultural heritage at their crossroads. This will explore how augmented reality might improve academic engagement and cultural understanding of Thai rice products for upper-secondary pupils. Higher education students must use their devices to register attendance and communicate with internet systems, timetables, and virtual learning environments. Chance to use AR technology Multiple professions have used AR, demonstrating its benefits. AR's learning benefits need more research. Higher education has used AR to improve special needs students' physical, cognitive, personal, and social skills in recent years. This systematic study examined AR technology in higher education special needs research from 2011 to 2020 using 8 worldwide databases. We reviewed 36 studies. Since AR worked with disabled youngsters, most research showed positive benefits. Results revealed that intellectual disability settings used AR technology. AR enhances students' social skills, relationships, and involvement. A comprehensive study on improving special needs people is essential. Future empirical research should include settings, student levels, and quantitative and qualitative data collecting (Jdaitawi et al.; A., 2021).

Using augmented reality technology to engage students and organize the learning environment for 21st-century teaching and learning, AR superimposes virtual visuals on real-world imagery. They are using tablets, smartphones, or other visual displays. Medicine, tourism, business, education, print media, and others use to see images as if they were in real life (Kritsanaphong Lertbamrungchai., 2020). Augmented reality invites consumers to experience the natural world through their senses. Be it seeing, hearing, or feeling. Augmented reality technology can generate new kinds of response and interaction in teaching and learning, improving efficiency by merging technology with conventional instruction. When educating, make pupils enjoyable-not dull. Motivation fosters student interest and knowledge. Augmented reality helps students.

Understand lesson information better. Augmented reality brings real and virtual learning aids to mobile Internet devices, improving mobility-oriented learning. The essay advocates AR in physics classes. The article explores the application of augmented reality in education, particularly mobile distance learning. This article discusses practice-based AR smartphone apps. Real schools utilize this technology to study physical orientation. AR improves education and humanities and natural science applications. This technology simplifies instruction and motivates students. Students today benefit most from visual education, which enhances science and technology. Augmented reality boosts students to self-study, increases audience interest in educational material, develops a desire to use modern interactive technical capabilities and technologies, and replaces textbooks and laboratory equipment with multimedia computer models, improving education quality—remote learning (Gurevych et al.; S., 2021).

Thailand, another biodiversity-rich nation, has numerous precious resources. Rice has been associated with Thai people for about 5,500 years. Rice has long been Thailand's staple cuisine. Long ago, past to present. As the adage goes, farmers are the backbone of Thailand, and rice production has been their primary employment since ancient times. This illustrates that rice is Thailand's principal economic crop, profitable to export and nourishing our grandparent's children and grandkids. Pathum Thani is another central rice-growing province. Pathum Thani Province has 953,660 farms, 334,851.68 of which are agricultural (35.11%), and 265,062 are rice farms. Pathum Thani Province's main crop is pathumthani fragrant rice (Pathum et al. Office, 2020). A questionnaire revealed that Pathum Thani Province high school pupils are now experiencing the issue. The 16-18-year-old generation is new—most care little about farming and maintaining Thai rice varietals.

Because we have several stimuli, I am worried it will fade if I wait. Thai youth are likewise less interested in agriculture. Traditional education is crucial, but it needs to work on engaging and educating 21st-century students. This section explains the challenges of conventional teaching methods and justifies AR in Thai rice education. Our fast-changing society and education may alter youth learning and behavior. In the 21st century, teachers must prepare students with quality instruction. Change agents like instructors help kids adjust to new learning environments. The survey asked Thai educators about 21st-century education. The study studied 41,991 teachers and educators. A statistical program assessed online questionnaire frequency and percentage data. Findings demonstrated that 21st-century classroom learning and teaching should be done appropriately, although misperceptions of support systems and learning environments were reported. Discussing educators equips students and teachers for modern classrooms (Prachagool et al., P., 2021).

From the background and importance of the above problem, the researcher sees its significance and is interested in developing augmented reality media about Thai rice products for high school students in Pathum Thani Province To enhance their knowledge and develop skills in rice processing through the use of Augmented Reality or AR

technology as a medium for presenting and creating learning. It is also a way to enhance vocational skills for students in response to the indicators of the Basic Education Core Curriculum, BE 2008, Vocational Learning Subject Group Standards. The researcher expects to Develop augmented reality media about Thai rice products. For high school students in Pathum Thani Province, This time, it can be used as a guideline for developing increased reality media in other subjects. Moreover, various formats create a different experience in learning. It helps stimulate learners to have fun with knowledge. Have better academic achievement. Make education management more efficient.

LITERATURE REVIEW

Conventional educational methods, while essential, have several obstacles in engaging and instructing pupils in the 21st century. This section describes some of the challenges traditional teaching techniques face, offering background for using AR in Thai rice education. Passive Learning Paradigm: In traditional classrooms, students receive information rather than actively participate. Textbooks, lectures, and rote memorization hinder hands-on, participatory learning. This one-size-fits-all approach may not accommodate varied learning styles and inhibit critical thinking. Students may struggle to understand abstract or complex concepts, especially those connected to agriculture, without hands-on experience. The Thai rice industry's difficult farming and economics may remain theoretical in traditional contexts. This lack of direct involvement with the material might impair comprehension and engagement. Cultural Disconnect Traditional schooling may need help to transmit Thai rice products' cultural relevance. With immersive experiences and contextual understanding, students can appreciate rice production and consumption of deeply rooted cultural traditions. This can lead to a shallow comprehension that reduces the subject's richness. Disparity in technology has penetrated modern life, yet not all schools have cutting-edge equipment. Inequalities in technology infrastructure and resources can impede creative techniques like augmented reality in education. These issues justify studying other educational methods like augmented reality. This project uses AR technology to make learning about Thai rice products more engaging, immersive, and culturally enriching for upper-secondary pupils. Using augmented reality and gamification in education can benefit students, help educators, improve the educational process, and facilitate the transition to technology-enhanced learning when used student-centered, following proper educational approaches and strategies, and considering students' knowledge, interests, unique characteristics, and personality traits. Students improved their behavior, attitude, and psychology, as well as their engagement, motivation, active involvement, knowledge, focus, curiosity, interest, enjoyment, academic achievement, and learning outcomes. Teachers also praised them. Virtual rewards boosted learning motivation. The necessity for validation tools, design methods, and theories was apparent. Finally, they could provide collaborative and individualized learning and promote students' cognitive and social–emotional development (Lampropoulos et al.; G., 2022).

Augmented Reality (AR): Technology is a component of the Virtual World, such as graphics, 3D videos, animation, and superimposed images in the real world that appear on the display screen. Which is a combination of reality and a created virtual world (Jaithip et al.., 2018). Augmented Reality in Education: AR technology offers dynamic, interactive experiences that combine physical and digital worlds, revolutionizing education. This part introduces AR and reviews educational studies. Augmented Reality (AR) is an immersive technology that adds computer-generated visuals, sounds, and 3D models to the user's real-world surroundings. Unlike virtual reality, which generates synthetic settings, AR adds digital features to the user's surroundings. This mix of virtual and real-world aspects connects students meaningfully with digital content-relevance AR content links dynamically to the learner's environment, giving relevant knowledge and experiences. Interactivity: Students can manipulate and explore AR items in real time. Immersive Engagement AR enhances learners' focus and immersion.

Multisensory Learning AR uses visual, aural, and tactile cues to accommodate different learning methods. Real-World Application AR lets students practice in real-world circumstances. Recent research has examined how AR affects STEM and cultural studies. These studies show that AR can improve learning, engagement, and retention. Previous AR Education Studies: STEM Education AR provides a practical way for pupils to understand complicated scientific concepts like molecular structures and celestial occurrences. History & Cultural Studies AR apps replicate historical settings and artifacts, letting students interact with cultural heritage. Language Learning AR enhanced language learning platforms overlay translations or relevant information on real-world items for contextual language experiences. Skills Training and Simulation AR simulations in healthcare and engineering provide realistic training scenarios without physical resources or surroundings. Geography and Environmental Studies AR can superimpose geographical data on real-world environments for interactive, location-based learning. AR is beneficial to learning and optimal for developing professional abilities in Social Education. Benefits included increasing student learning dynamism, motivation, and interaction; drawbacks included needing to be more inaccessible, requiring prior expertise, and reducing sociability. It can also help with social education in various areas.

In conclusion, AR in university training in this field makes information more dynamic and, naturally, sustainably, creating a highly transferable and inspiring path to content and competency development. AR-based mobile touring systems increased students' memorization more than conventional systems. The proposed system's good influence on students' actualized interest and task-based interest elements is encouraging for outdoor experiences. These experiments imply that AR technology could boost outdoor learning interest and performance. We recommend designing AR virtual objects effectively using an AR-based mobile touring system in authentic learning activities to improve material memory and learning engagement (Chin et al.; C., 2020). Augmented Reality Media: Augmented Reality media uses software and connecting devices like webcams, computers, and other equipment to combine real-world elements with virtual or augmented ones. Computers, smartphones, projectors, and other devices show virtual aspects. Depending on the AR media, these virtual elements can interact with users immediately and be static images, three-dimensional objects, moving images, or multimedia content with audio (Somsak et al.., 2015). The benefits of AR. are that it allows face-to-face learning in the classroom and remotely. Wiwat Meesuwan (2015) says it can adjust information transmission and response between the actual and virtual worlds, raising the natural world's level.

Thai Rice is a civilization that feeds on rice. Rice, a long-standing Thai food crop, symbolizes human society. Rice husks of soil used to produce pottery in Ban Chiang, Non-Nok Tha District, Ban Khok Subdistrict, Phu Wiang, and District provide traces of Thai civilization for at least 5,500 years. It is thought to be Thailand's oldest rice grain. Includes hints of rice grains discovered at Pung Hung Cave. Mae Hong Son. The husks resemble high-altitude large-grain sticky rice. Rice grain hunting is also a desire. Rice chaff marks on pottery and ashes in the soil at Khok Phanom Di Phanat Nikhom District Chonburi Province. It portrays a coastal prehistoric rice-growing village. Evidence includes wild rice flowers in Khao Talu Cave. Kanchanaburi Province, 2,800 years old, is in the late Neolithic-early Metal Era transition. 6,000-year-old cave or stone wall paintings in Pha Mon Noi, Ban Ta Kum, Huai Phai Subdistrict, Khong Chiam District. Ubon Ratchathani. This is like cultivating rice-like cereals. An image of a buffalo sprouting rice-like plants illustrates that humans can produce rice successfully. Thai Rice Exporters Association (2022). The idea for product: Good products drive market success. The products represent consumer aspirations. Products please society. Successful items ensure self-promotion. If they fit consumer wants, they are marketable and should inspire enthusiasm, which matters to market organization. It lets the market decide. Marketers base product meaning on consumer wants. A. Chanchai (2008) Development of products: It takes research, analysis, and design to create creative goods that suit customer needs. Creating new items boosts a company's competitiveness and success. New products can be innovations, adaptations, enhancements, or market entries. Phhalawan Phruekmanee (2015).

Self-learning refers to the process of acquiring knowledge or skills through self-directed learning. With or without the guidance of a teacher. Students establish learning objectives. This study aims to investigate the necessity of solitary studying and discover various available learning resources. Select suitable learning methodologies and assess the outcomes. In 2015, Somkid Issarawat conducted a study. The Basic Education Core Curriculum of 2008, with the 2017 update. The disciplines offered by the Vocational Learning Group aim to provide students with essential life skills and knowledge. It is important to remain conscious of any alterations. The capacity to creatively employ life experiences, professional expertise, and technical knowledge. Compete in Thai and global society. Developing a well-defined career trajectory, cultivating a passion for one's work, and maintaining a positive mindset are crucial to achieving professional success. Experiencing contentment and possessing a sense of self-reliance within societal structures. The Relationship Between Substance Use and Career Outcomes: Acquiring knowledge, proficiency, practical know-how, and adherence to professional principles and standards are essential for comprehending, possessing aptitude, and navigating one's chosen vocation. Leverage technological advancements to enhance professional pursuits while upholding ethical principles and fostering a constructive mentality. According to the Ministry of Education (2017), One crucial factor influencing positive learning outcomes Factors That Influence The engagement of students in various activities and initiatives inside an educational institution. The level of student engagement is crucial in determining the quality of learning outcomes. This section examines the various factors that impact student engagement, specifically emphasizing the role of technology-mediated learning environments in this context. Personalization and cognitive relevance are closely interconnected. Engagement among students tends to develop when they perceive the subject to be pertinent to their interests, aspirations, and prior knowledge. The utilization of technology, namely adaptive learning algorithms and personalized content distribution, allows for the customization of educational experiences to suit the unique needs of individual learners. Consequently, this approach enhances the cognitive relevance of subject matter for students. The concepts of interactivity and participatory education are being discussed. Active participation in the learning process facilitates the enhancement of higher-order cognitive functions and fosters a more profound understanding. Technological-mediated learning platforms, specifically those integrating interactive elements like quizzes, simulations, and collaborative exercises, have been found to enhance critical thinking skills and foster active engagement with the subject matter under study. Providing autonomy and choice

in education entails granting students the authority to govern their learning trajectory and discretion in selecting assignments or projects. This approach has the potential to enhance their level of participation significantly. Technological advancements allow Students to explore subjects that align with their interests and preferred learning modalities. Technology facilitates self-paced learning and grants students access to various educational resources. Timely feedback and assessment are crucial to address misconceptions and encourage learning promptly. Educational technology, such as online quizzes and automatic grading systems, enables students to monitor their progress and promptly make any required modifications. This technology offers immediate feedback to students, facilitating real-time corrections. The concept of multimodal learning experiences refers to using many sensory modalities to acquire knowledge and skills. Providing diverse instructional styles and materials enables educators to cater to the diverse learning preferences of pupils. Technological improvements have facilitated the integration of multimedia elements, such as movies, interactive simulations, and Virtual Reality, into educational settings. Using gamification and rewards in education has created a dynamic and immersive learning environment that engages many students. Incorporating game design elements like points, badges, and leaderboards enhances the educational experience, fostering a competitive spirit and a sense of achievement among students. Gamified aspects integrated into technologically mediated platforms can serve as a means to promote active student engagement and facilitate academic advancement. Additionally, technology can facilitate collaborative learning opportunities, such as through discussion forums, virtual classrooms, and document editing, promoting collaborative engagement and interpersonal cooperation. These opportunities foster community and shared responsibility for educational outcomes. Social interactions with peers can yield valuable perspectives and assistance, enhancing engagement. Understanding the various elements influencing student engagement offers a conceptual foundation for integrating augmented reality into educational environments. The objective of this study is to enhance student engagement in the domain of Thai rice education for students at the upper secondary level. This goal will be accomplished using Augmented Reality (AR) technology's interactive nature, customization capabilities, and multimodal learning opportunities.

METHODS

Population and sample group:
The population of high school pupils at Dipangkornwittayapat (Mattayom et al.) The school served as the subject of this investigation. The total number of students: 369 individuals and the students of Secondary 4 at Dipangkornwittayapat (Mattayom et al.) Under the jurisdiction of the Pathumthani Secondary Educational Service Area Office, the school served as the sample group for this research. There was one classroom with a total of 30 students. The academic year was 2022. Because the room in question will be used for a class on rice during the second semester of the academic year 2022, this information was collected by picking a specific sample, also known as "Purposive Sampling."

Instruments of Research:
(1) An Augmented Reality Media Presentation on Thai Rice Goods Intended for Upper Secondary Students (Grades 10–12). (2) Questionnaire for Upper Secondary Level (Grades 10-12) students seeking the opinions of industry professionals evaluating the quality of augmented reality media on Thai rice products. (3) The pretest and the subsequent test., and (4) An evaluation form for students in Secondary 4 regarding the use of augmented reality media on Thai rice products intended for students in Upper Secondary Level (Grades 10-12).

Data collection:
Collecting data includes researching many concepts, fundamentals, and theories associated with producing augmented reality media. The increased reality material that the researchers generated should be brought to the professionals so that they can review it. To ensure consistency between content, language, questions, teaching activities, and creation aim, consult with measurement and evaluation specialists to determine tool usefulness. Then, make the necessary improvements and corrections to ensure that everything is accurate and comprehensive, just as the recommendations of the specialists suggest in every regard. After that, the augmented reality media was utilized three times with students from schools that were not part of the sample group, including measuring the effectiveness of the students on an individual level. After conducting an efficiency trial with small groups and field testing, the team made adjustments and changes until the product reached an acceptable level of performance. As a result, media based on augmented reality was utilized with the sample population.

Statistics used to analyze data:
(1) Determine whether or not using augmented reality media for marketing Thai rice products at the upper secondary level (grades 10–12) is effective. By applying the equation for calculating efficiency E1/E2 (2), Compare the pretest results with the post-test using a t-test for dependent samples with a significance level of .05 (3) Using the mean and standard deviation (SD.), investigate the contentment children in Grade 4 feel with access to augmented reality media.

FINDINGS

Table 1: Report for upper secondary level (Grades 10-12) totaling 30 people that summarizes the findings of an investigation into the effectiveness of augmented reality media on Thai rice products.

List	Full score	Average score	percentage	Benchmark	E1/ E2
Score during study	50	41.17	82.33	80	82.33
Posttest	20	16.33	81.67	80	81.67

Table 1 shows the results of using augmented reality media on Thai rice products for students in grades 10-12. Then, take the results of the scores from the test that 30 Mathayom 4 students completed. These scores were computed as an average percentage of 82.33, and the mean rate of post-test scores was 81.67. This demonstrates that augmented reality media about Thai rice products is effective. For secondary school pupils in the province of Pathum Thani, it has efficiency according to the requirements of 80/80, which means that E1/E2 is equivalent to 82.33/81.67, which satisfies the assumptions.

Table 2. This study aimed to compare the pretest and post-test performance of students who had learned about Thai rice products from augmented reality media at the upper secondary level (Grades 10–12).

	Full score	Average score	SD.	t	Sig.(2-tailed)
Pretest	20	8.77	2.22	20.96	.00
Posttest	20	16.33	1.45		

As shown in Table 2, the results of applying augmented reality media to Thai rice products at the upper secondary level (Grades 10-12) were as follows: The standard deviation for the pretest was equal to 2.22, and the average score was 8.77. The pupils learned about Thai rice products at the upper secondary level (Grades 10-12) through augmented reality media. After that, the pupils' overall performance on the post-test averaged a zero. The standard deviation is 1.45, the mean value is 16.33, and the t-test analysis before and after the study is 20.96, statistically significant at .05.

Table 3. The following are the findings from an investigation into the extent to which students in grade 4 were satisfied with augmented reality media about Thai rice products intended for students in grades 10-12.

	Evaluation list	$\bar{x}$	SD.	Interpret results
1. Media				
1.1	Clear explanation of media usage	4.48	.50	A lot
1.2	Beautiful and interesting media format	4.52	.50	The most
1.3	Easy to use and easy to learn	4.42	.51	A lot
1.4	The media is appropriate for use in learning	4.32	.55	A lot
	Total average	**4.44**	**.52**	**A lot**
2. Content				
2.1	The content meets the learning objectives	4.45	.50	A lot
2.2	The language used in the lessons is easy to understand	4.39	.55	A lot
2.3	Presentation of content is easy to understand	4.45	.49	A lot
2.4	The amount of content in each story is appropriate	4.48	.56	A lot
2.5	The content arrangement and teaching steps are easy to understand	4.39	.50	A lot
	Total average	**4.43**	**.52**	**A lot**
3. Measurement and evaluation				
3.1	Clarity of questions and answers	4.58	.50	The most
3.2	Appropriateness of the number of assessments	4.52	.47	The most
3.3	Alignment of assessments with content	4.45	.55	A lot
	Total average	**4.52**	**.51**	**The most**
4. Instructional activity organization				
4.1	Encouraging learner engagement in activities	4.61	.48	The most
4.2	Facilitating learning anywhere, anytime	4.61	.53	The most
4.3	Promoting self-directed learning	4.74	.50	The most
	Total average	**4.65**	**.50**	**The most**

	Total average	4.49	.51	A lot

According to Table 3, the results of the evaluation of the level of satisfaction that secondary 4 students have towards augmented reality media on Thai rice products for upper secondary level (Grades 10-12) reveal that a total of 30 students have, in general, expressed a high level of satisfaction, with an overall average score of 4.49. They were most pleased with fostering self-directed learning, where they received an average score of 4.74 out of 5. Finding examples of the secondary 4 expressing the least satisfaction was only possible.

CONCLUSIONS AND EVALUATION

The research project on developing augmented reality media for Thai rice products is aimed at upper-secondary students (grades 10–12). Consistent with strategies and promotional activities that let students understand on their own, as well as creating a connection between the ability to self-learn and the ideas presented in the research (Napharat, L., 2017), it is evident that students can indeed acquire knowledge through self-directed learning activities in a variety of subjects. This strategy emphasizes fostering students' natural curiosities and encouraging their natural enthusiasm for learning. According to Sangsawang and Tawang (2015), educators play a critical part in fostering students' capacity for understanding and independent thought by cultivating an atmosphere that encourages acquiring information and insight through self-discovery. As the following examples demonstrate, (1) the explanation of the findings is consistent with the objectives and hypotheses of the research. The usage of augmented reality media on Thai rice goods for upper secondary level (Grades 10-12) students in Thailand involves various important learning activities. This level of education focuses on Thai rice products. These activities include lesson plans, directives, knowledge sheets, activity sheets, and augmented Reality (AR.) supplementary materials that focus on teaching subjects related to the history of rice, rice plant characteristics, rice varieties in Thailand, nutritional content, and dietary aspects of rice, and rice processing. These subject topics correspond to the core curriculum 2008 (Revised Edition 2017). The term "augmented reality" refers to a technology that can combine real-world settings with virtual elements such as photographs, animations, or three-dimensional objects in a seamless manner. As part of their investigation, the academics have produced Augmented Reality (AR) markers that can be scanned using mobile devices like smartphones and tablets. When students point their mobile devices at these augmented reality markers, the screen converts the markers into still images, films, and accompanying noises developed by the course's creators. This strategy promotes learner engagement, enjoyment, and an educational experience that is more captivating, which eventually leads to enhanced learning results. It is crucial, however, to recognize that learning using augmented reality technology may bring difficulties in commencing student activities. It can potentially interfere with the learning process and lead to detours from the goals of the learning experience. The researchers have developed user guides for educators and learners to address this issue. The goal of these manuals is to guarantee that students are adequately prepared before they begin interacting with the augmented reality supplemental resources. These instructions seek to optimize the usefulness of the AR materials while adhering to a set efficiency requirement of 80 percent effective use for each item. According to the research findings, pretest results were conducted before high school students in Pathum Thani Province were introduced to AR supplementary materials to teach Thai rice product subjects. Every one of the thirty students who took the pretest turned in a score that was an average of 8.77 out of a potential 20 points. After finishing the pretest, the researchers presented supplemental AR materials to facilitate self-directed learning activities. The students participated in these activities, made learning activity sheets for each topic, and showed greater interest and passion for learning due to their efforts. Their development was monitored throughout their education, and their average score was computed; the final result was 41.17% out of 50 points. A post-test was given to the students after they had completed the AR supplementary materials and had gained knowledge of Thai rice products. The post-test findings indicated an average score of 16.33 out of 20 points. According to these findings, using AR supplementary resources effectively boosted learning outcomes. The efficiency of these resources reached 82.33 out of 81.67, which is higher than the benchmark of 80 out of 80. Their study focused on constructing digital classes on problem-solving using AR technology for first-year high school students. This research was aligned with the research undertaken by (Supawadee et al.., 2021). The research findings indicated that the AR technology-based digital training on problem-solving displayed an efficacy rating of 81 out of 80.2. The research findings indicate that the learning effectiveness, measured by test scores, improved significantly after augmented reality media on Thai rice products for upper secondary level (Grades 10-12) engaged with AR supplementary materials on Thai rice products. Before the learning process, the students had an average test score of 8.77, with a standard deviation (SD.) of 2.22. After the students had learned through AR supplementary materials, they took a post-learning test, and their average test score increased to 16.33, with a standard deviation (SD.) of 1.44. The statistical analysis, specifically the t-test, comparing the pre-learning and post-learning test scores yielded a significant difference with a t-value of 20.96 at a significance level of .05. This indicates that the improvement in learning outcomes after engaging with the AR supplementary materials is statistically significant. Following the research conducted by (Watcharapol Unjanam., 2020), the study focused on developing AR technology-enhanced media for scouting activities. The research findings revealed that the sample group had

significantly higher learning effectiveness scores after engaging with the AR technology-enhanced media than before the learning process. The statistical significance was observed at a level of .05. (3) The research findings indicate that secondary 4 expressed high satisfaction with using AR supplementary materials on Thai rice products. The average satisfaction score was 4.49, suggesting that the students found the learning materials responsive to their needs, easy to use, and convenient for their learning process. Additionally, the materials were visually appealing, interesting, and aligned with the learning objectives. The AR supplementary materials for Thai rice products helped stimulate students' interest in participating in activities, encouraged them to get hands-on, and challenged them to become more engaged. Furthermore, when students applied their efforts, they achieved immediate success. This level of satisfaction aligns with the research conducted by (Jorinat et al. Apiratitong., 2019), where they studied the development of digital media along with AR technology using cooperative learning techniques (STAD) in the context of sixth-grade computer science classes. Their study found that the sample group expressed the highest level of satisfaction with digital media combined with AR technology, with an average satisfaction score of 4.79.

Recommendations:
Before beginning each teaching and learning session, check that the necessary supplies are available and that there is a connection to the internet. Students should be sufficiently prepared by receiving instruction in AR media tailored to the specific protocols for each stage of the learning activities.

Recommendations for future research:
1. It is recommended that additional studies and studies be carried out on Thai rice to improve the breadth and depth of one's expertise.
2. It is essential to explore the potential of generating AR media for various aspects of Thai rice, including the science and technology involved in rice farming and the production of modern rice products. This will help in the growth and development of this area.
3. To broaden the educational value and impact of AR, consider using AR media for teaching and learning objectives across various topic areas.

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The Development of Learning Activity through the KWDL Technique Combined with the Bar Model to Improve Problem-Solving Ability in Math for Secondary 1 (Grade 7) Students

Aldrin B. Boca
Faculty of Technical Education, Rajamangala University of Technology Thanyaburi, Pathum Thani, 12110, Thailand
aldrin_b@mail.rmutt.ac.th

Rossarin Jermtaisong*
Faculty of Technical Education, Rajamangala University of Technology Thanyaburi, Pathum Thani, 12110, Thailand
rossarin_j@rmutt.ac.th

ABSTRACT
The research entitled The Development of Learning Activity through KWDL Technique Combined with BAR Model to improve problem-solving Ability in Math for Secondary 1 (Grade 7) Students made use of a quasi-experimental design wherein the experimental group was exposed to learning activities through the KWDL technique combined with BAR model while the control group learned through traditional. The sample used in this research was 38 Secondary 1 (Grade 7) students from Rizal National Science High School, Rizal Province, Philippines who studied in the second semester of the academic year 2022 by cluster sampling. The research instruments consisted of 1) learning management plans with learning activities through traditional; 2) learning management plans with learning activities through the KWDL technique combined with the BAR model; 3) problem-solving ability in a Math test. Data analysis included mean, standard deviation, and t-test. The results showed that: 1) the problem-solving ability in Math of Secondary 1 (Grade 7) students after studying learning activities through the KWDL technique combined with the BAR model was higher than before learning at a statistical significance level of .05 level; 2) the problem-solving ability in Math of Secondary 1 (Grade 7) students after studying learning activities through traditional was higher than before learning at a statistical significance level of .05; 3) the problem-solving ability in Math of Secondary 1 (Grade 7) students studying learning activities through KWDL technique combined with BAR model was higher than the learning activities through traditional at statistical significance level of .05.
KEYWORDS: KWDL technique, BAR model, Math problem-solving ability.

INTRODUCTION

Mathematics is a fundamental part of human thought and logic and integral in attempts at understanding the world and ourselves. It provides an effective way to build mental discipline and encourages logical reasoning and mental rigor. Also, mathematical knowledge plays a crucial role in understanding the contents of other subjects such as science, social studies, and even music and art. That is why mathematics should be treated as an important subject in the overall curriculum. It can be traced back to the medieval times when Greeks considered mathematics specifically geometry and algebra to be the two of the seven liberal arts courses. This historical role supported the notion that mathematics has provided the mental discipline required for other disciplines. In addition, mathematics is applied in various fields and disciplines such as science, engineering, economics, electronics, etc. The complexity of those problems often requires relatively sophisticated mathematical concepts and procedures. Mathematics provides foundational knowledge and skills for other subjects which is why in some curricula, mathematics is offered independently to support the study of other school subjects as an instrumental subject combining mathematics and other fields (ICMI, 2008).

Mathematics education usually concentrates on achievement in the cognitive domain. Despite recognizing the importance of mathematics, most of the students perceive the subject as difficult and boring and possess a belief that mathematics is not within their reach and that only people with high intelligence can learn mathematics. Most of the students follow surface learning strategies (Abdul Gafoor & Kurukkan, 2017). The lessons of science and mathematics using a learning management plan of phenomenon-based approach with e-learning media was at the most appropriate level with a total average of 4.77 while the ability to design science and math learning management plan was at a very good level and able to manage learning at a very good level (Samahito, 2020).

A study found that learners feel confident regarding mathematics learning. The majority of the participants expressed positive views regarding mathematics with most expressing that they feel happy to learn mathematics. Their optimism was slightly over-confident when they considered that mathematics rules can never be proven

wrong. Moreover, it was found that the students are enthusiastic in their learning of mathematics. They found mathematics interesting and valuable. It is an interesting, useful, and analytical power-generating subject. Although very few found studying mathematics boring and tough (Akhter and Akhter, 2018). Meanwhile, the Philippines ranked 2nd from the bottom among the participating countries in the recent Programme for International Student Assessment (PISA) 2018. This alarming result revealed that Filipino students recorded a mean score of 353 points in Mathematics Literacy which is significantly lower than the OECD mean of 489 points. Data also showed that there was a decrease of 61 points in 2019 and even scored lowest among 58 countries in 2020. It was also reported that only 1 out of 5 Filipino students or approximately 19.7% attained at least the minimum proficiency level (Level 2) in Mathematics Literacy. However, the 2015 Review Report on the Philippine Education for All on National Achievement Test stated that while the Filipino learner's NAT Mean Percent Score (MPS) has increased over the eight years from 2005 to 2013, it has not yet reached 75 percent MPS target. Elementary level NAT is 6.12% points away from the target; while secondary level NAT is 23.59% points away from the target (Department of Education - National Report of the Philippines, 2019). In addition, the Philippines only scored 297 in mathematics and 249 in science, which are significantly lower than any other participating country. In mathematics, only 19% of Filipino students were on the Low benchmark, which means that they had "some basic mathematical knowledge," while 81% did not even reach this level. They can add, subtract, multiply, and divide one- and two-digit whole numbers. They can solve simple word problems. They have some knowledge of simple fractions and common geometric shapes. Students can read and complete simple bar graphs and tables (Magsimbol, 2020).

Mathematics teachers have a great role to play in the development and enhancement of the student's mathematical skills. After all, in the educative process, teachers are the most important factor contributing to student achievement. It is in this premise that teachers should be able to have mastered effective approaches and strategies in teaching mathematics that can help increase students' mathematical knowledge and skills which is key to improving mathematical outcomes (Ali et al, 2012). This premise is supported by a citation in an article when they said that as educators, teachers face an increasing list of demands and continue to be held accountable for the success of our students. Teachers get tethered down with thoughts of content coverage, state testing, and other accountability challenges. In a sea of responsibilities, teachers must remember why they started this journey because they wanted to make a difference in the lives of their students. The one factor that surfaced as the single most influential component of an effective school is the individual teachers within that school (Cleary, Morgan, Marzano, 2018). Moreover, great teachers can make up for the gaps and shortcomings if they anticipate them and make a plan for success throughout the school year. What teachers need to make the best impact are more training and more planning. Creating good teachers is a process that rarely occurs on their own. They work with good teams and create impactful plans based on data and experience. Not only are teachers not going anywhere anytime soon they are also the answer to getting students back on track with the time and skills they have missed out on (Fronk, 2020). Study after study shows teacher quality is the biggest contributor to academic achievement. The overwhelming factor in student achievement is the effectiveness and quality of the classroom teacher. They are the ones directly responsible for engaging the students in learning. They build a relationship with the student. Without that relationship, students cannot even create interest in coming to school, much less imagine engaging in learning. A quality teacher can make a decided difference in a student's educational career. Effective classroom teachers improve attendance, reduce discipline and solve problems between and among students (Ciurczak, 2018). Many students struggle in mathematics maybe because they find it dull and demotivated in understanding numbers and formulas. They see mathematics as an abstract thing and irrelevant figures that are difficult to comprehend. In this particular scenario should teachers get in and provide intervention so that students may think about mathematics the other way around? Students should be given activities that would help them see how mathematics relates to real-world scenarios to spark their interest in the subject (Akhter and Akhter, 2018). The use of pedagogical strategies that would help students effectively solve word problems and improve their ability should be introduced to them. The choice of the strategy would depend on the teachers. It should be able to elicit the optimum learning achievement desirable to meet the learning competencies designed for the subject (Akhter and Akhter, 2018).

The researchers were compelled to embark on introducing the development of learning activity through the KWDL technique combined with the BAR model as curriculum innovation with the hope that their mixture would help improve the problem-solving ability in mathematics among Secondary 1 (Grade 7) students.

LITERATURE REVIEW
It was found that the learning achievement in mathematics before and after being taught by the mathematics problem-solving packages based on KWDL Technique was statistically significant at the 0.05 level of significance. Also, the learning management in mathematics and problem-solving abilities before and after being taught by the mathematics problem-solving packages based on KWDL Technique were significantly different at the 0.05 level

of significance. The satisfaction of the third-grade students with the mathematics problem-solving skill packages based on the KWDL Technique was at the highest level (Meekhamthong, 2020).

The result of the research showed that the ability in solving mathematical problems of students who study by using collaborative learning along with the KWDL technique was higher than the students who received learning by using traditional method with statistical significance at the level of 0.05 while the collaborative learning skills of students who study by using collaborative learning along with KWDL techniques were higher than students who are learning by traditional method with statistical significance at the level of 0.05 (Suriyachote & Siharak, 2020).

Research showed that (1) the students' reading skills were taught by using the K-W-L strategy in criteria as good. Shown by the mean of the post-test was 86.22, (2) the students' reading skills taught without using the K-W-L strategy in criteria as adequate, and (3) thus, the difference between the students' reading skills taught with and without using K-W-L strategy was significant. It means that the students taught by using the K-W-L strategy were better than the students taught without using the K-W-L strategy. In the same research above, the researcher suggested that to improve the students' reading skills by using the K-W-L strategy, the students have to read a lot of reading texts and try to comprehend the text. For the teacher, it would be better if the teacher can apply the strategies of teaching reading, especially for reading skills as a facilitator, motivator, and administrator (Kusumaningrum & Wahyu, 2018).

Another research findings revealed that after being taught the topic of differential equations via the KWDL technique learning management, over 60% of the participants satisfied the set criteria, at the statistically significant .05 level while the mean score of the satisfaction of the subjects regarding learning management was at a "high" overall level. Also, it was revealed that the students who learned using the KWDL technique showed higher mathematical word-problem-solving ability and higher mathematical retention skills than those who learned using the conventional approach at 0.01 level of significance (Rattanosot, et.al., 2018).

Furthermore, a study revealed that the fifth-grade students' problem-solving abilities after applying the TGT technique with the bar model method were statistically significant at the level of 0.05 whereas the problem-solving abilities after applying the TGT technique with the bar model method were higher than the 75 % level. 2. The opinion of the fifth-grade student's towards taught TGT technique with the bar model method was at a high agreement level. On the aspects of the learning environment, learning usefulness and learning activities were perceived at a high agreement level respectively (Chaisongkram & Vanichwatanavorachai, 2018).

In another study, it was observed that the efficiency of problem-solving questions of addition, subtraction, multiplication, and division instructional package for fourth-grade students using KWDL and BAR-drawing technique was equivalent to 78.07/77.23, which was higher than the set criterion of 75/75 2. The achievement of the students was found that the scores of the posttest were higher than the pretest at the significant level of .01 3. The satisfaction of students on learning by using problem-solving questions of addition, subtraction, multiplication, and division instructional package for fourth-grade students using KWDL and BAR-drawing technique was ranked at a high level (Khuankawin, 2018).

In addition, it was found that the ability to solve mathematical problems of Primary 3 (Grade 3) students after learning management with the SSCS model together with drawing the BAR model was significantly higher than before learning management at 0.05 level; the ability to solve mathematical problems of Primary 3 (Grade 3) students after learning management by traditional methods was significantly higher than before learning management at 0.05 level, and the ability to solve mathematical problems of Primary 3 (Grade 3) students learning management with the SSCS model together with drawing the BAR model was significantly higher than another group of students learning management by traditional methods at 0.05 level (Piemsuk and Siharak, 2019).

Moreover, the objectives of the study included the student's satisfaction with the learning activities based on the STEM Education and KWDL Technique. The findings showed that the students made a mean score of 37.83 or 75.65% of the full marks on mathematics problem-solving ability, and 32 students or 80.00% of the group passed the prescribed criterion of 70% which is higher than the prescribed criterion while the students as a whole expressed the highest level of satisfaction with the learning activities basing on the STEM Education and KWDL Technique (Butriang and Tanunchaibutra, 2018).

A similar study whose objectives were to compare the learning achievements between students who learned based on the KWDL technique and traditional approach, and to compare the mathematical problem-solving abilities of students between the two groups, found that the efficiencies of learning activities; based on the KWDL technique was 80.78/80.14 and the traditional approach was 78.98/75.7. Also, the effectiveness index of the KWDL lesson plans was 0.5638 whereas the traditional lesson plans were 0.5014 and the students who learned based on KWDL lesson plans had higher post-learning achievements than their counterparts at a .05 level of significance (p<.05) (Summart and Viriyapong, 2021).   In addition, a study found that the post-test scores of the respondents from the two groups improved in comparison to their pre-test scores. The mean pretest and mean posttest scores of both groups showed significant differences. The results showed that the use of virtual manipulatives in converting fractions to decimals had a significant difference compared with the use of the traditional method. Hence, the use of concrete manipulatives was highly effective (Parungao, 2021).

Indeed, mathematics is a difficult subject because it requires learners an eclectic understanding of its concepts and dynamics. But since mathematics is essential in all curricular programs, students cannot get rid of it and it will continue to haunt them in any level of schooling they are in.   That is why the teachers should have a great part in making mathematics education fun, interesting, and easy to motivate the learners to engage in it and in its activities specifically the word problem solving where most of the students fail to succeed.

Developing the learners' problem-solving ability is another issue.   This requires the mathematics teachers themselves a wide range of knowledge and skills in the pedagogical field as well as their understanding of the mathematics curriculum and psychological processes and theories related to learning. Their adeptness in these necessary traits in education will enable them to select and use the methods and techniques that will eventually promote effective learning as was asserted by various researchers of the use of the KWDL technique and BAR Model Methods.

The richness of the literature and studies reviewed in this paper enabled the researcher to understand better his proposed research which is The Development of the Learning Activity of KWDL Technique Combined with the BAR Model to Improve Problem-Solving Ability in Math for Secondary 1 (Grade 7) Students.

METHODS
The study was anchored on Jean Piaget's Cognitive Developmental Theory which assumes that learners go through the same sequence of development at different rates. It also explains that a change in the reasoning level of a child happens when acquiring new ways to understand the world. Individuals construct their knowledge during interaction with the environment. The content of instruction needs to be consistent with the developmental level of the learners. Therefore, teachers must provide classroom activities and a variety of experiences for individuals and small groups rather than the total class group. Piaget also emphasizes that teachers should allow opportunities to classify group information to facilitate assimilating new information with prior knowledge to present problems that require logical understanding (Kendra, 2014).

Furthermore, this study also made use of progressivism and constructivism principles of education which both believed that education must be learner-centered. Learners learn best when pursuing their interests and satisfying their own needs. Learners construct knowledge rather than just take information passively. They build their representations and incorporate new information into their prior knowledge.

The development of learning activity through the KWDL technique combined with the BAR model allows the learners to make use of their pre-existing knowledge and use them in the mathematical problem-solving process. This also enables the learners to construct knowledge based on the given information using BAR modeling in presenting and solving the problems.

In addition, this research was undertaken at the Rizal Science National High School in the Province of Rizal, Philippines. The Rizal National Science High School, whose motto is the home of scholars, where excellence is a way of life, first opened in the school year 1998–1999. It was established to provide for a more intensive and advanced secondary education program with special reference to science and technology. The establishment of the Rizal National Science High School was conceived and proposed by Cong. Gilberto M. Duavit of the First District of Rizal envisioned Rizal to be "the knowledge center in Asia" in coordination with the Department of Education, Culture, and Sports (DECS) Division of Rizal.

At present, the Rizal National Science High School firmly stands at its permanent site Jose P. Rizal St., Dalig, Batingan, Binangonan, Rizal Philippines starting June 4, 1999 to continuously serve the community in providing quality education anchored to the Basic Education Curriculum of the Department of Education in the Philippines

and still operates applying their rigorous and competitive admission guidelines and grading system. In addition, the Rizal National Science High School is distinctly unique in its way of becoming the seat of contributing to Science, Technology, Mathematics, and Language Knowledge among its students (RA 8724, Congress of the Philippines).

In response to Rizal National Science High School's vision of creating innovation, this research determined the improved problem-solving ability in mathematics learning management using the KWDL Technique combined with the bar model among Secondary 1 (Grade 7) students of Rizal National Science High School in the Province of Rizal, Philippines. KWDL technique has been widely obsoletely used in Thailand and Asia but the researcher, with the able assistance of his competent research adviser, has thought of mixing the technique with Singapore's BAR model approach. The BAR model method will provide students with a powerful tool for solving word problems. The lasting power of bar modeling is that students can easily use bar model year after year once they have mastered the approach. The approach will lead students down the path toward mathematical articulacy and number sagacity. Moreover, the researcher, in his readings, has not seen nor read any research article or previous works using the KWDL technique combined with the BAR model specifically in the Philippines in Asia. The result of this research is hoped to bring in a new flavor to curriculum innovation not only in the locale where the study was conducted but around the globe.

The population was composed of three (3) sections with 30 students per section divided into two clusters – the first cluster learned on site and the second cluster learned online. However, the researcher selected via simple random sampling technique only two sections which were randomly assigned to an experimental group and a control group. The sample of this research included thirty-eight (38) Secondary 1 (Grade 7) students from Rizal National Science High School in the Province of Rizal, Philippines studying in the education year 2022. The thirty-eight (38) students were divided into two groups who were randomly assigned to an experimental group and a control group with nineteen (19) students per group.

The research instruments consisted of 1) learning management plans with learning activities through traditional; 2) learning management plans with learning activities through the KWDL technique combined with the BAR model; 3) problem-solving ability in a Math test. The learning management plans with learning activities through the KWDL technique combined with the BAR model and the traditional and test questions which were used by the experts and subject specialists in evaluating its content. The Index of Item Objective Congruence (IOC) was at 0.67 indicating that the test questions used were consistent with the objectives and excellent with a Cronbach alpha coefficient of 0.96. The independent variables were the learning management plans with learning activities consisting of two methods such as the Traditional and the KWDL Technique combined with the BAR Model Approach specifically developed for Secondary 1 (Grade 7) students from Rizal National Science High School in the Province of Rizal, Philippines studying in the education year 2022. The thirty-eight (38) students drawn from the population of ninety (90) Secondary 1 (Grade 7) students were divided into two groups and were randomly assigned to an experimental group and a control group with nineteen (19) students per group. While the dependent variable was problem-solving ability in mathematics using the learning activity of the KWDL technique combined with the BAR model have been higher after-study achievement than the before-study KWDL technique combined with the BAR model with a statistical significance of 0.05. The data were analyzed using *Mean*, standard deviation, t-test for dependent samples, and t-test for independent samples as well as Effectiveness Index (EI).

FINDINGS

Table 1: Analysis Results to compare problem-solving ability in Math of the Secondary 1 (Grade 7) students between the before and after learning activities through the KWDL technique combined with the BAR model

Number Student	Before Study	After Study	Increase (D)
1	25	34	9
2	23	33	10
3	27	35	8
4	14	31	17
5	10	28	18
6	22	34	12
7	15	31	16
8	7	34	27
9	15	33	18
10	15	24	9
11	8	28	20
12	9	24	15
13	6	29	23
14	12	33	21
15	15	35	20
16	16	33	17
17	9	34	25
18	8	29	21
19	13	31	18
Mean ($\bar{x}$)	14.16	31.21	17.053
S	6.23	3.392	
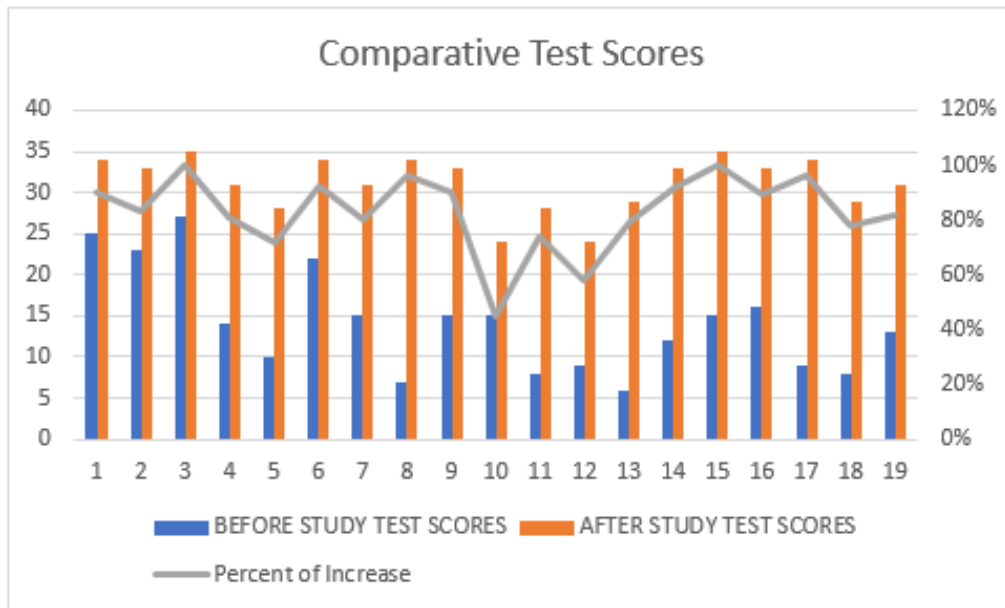
Figure 1 Comparison of the Problem-Solving Ability in Math of the Secondary 1 (Grade 7) Students between the Before and After Learning Activities through the KWDL Technique combined with the BAR Model

From Table 1 and Figure 1, the results revealed that after-study test scores of problem-solving ability in Math of Secondary 1 (Grade 7) students studying learning activities through the KWDL technique combined with the BAR model ($\bar{x}$ = 31.21, s = 3.392) were higher than their before-study test scores ($\bar{x}$ = 14.16, s = 6.23).

This implies that the students performed better in the after-study test as evidenced by a smaller standard deviation compared with the before-study test. In addition, the effectiveness index of 81.82% indicates that after the learning activities through the KWDL technique combined with the BAR model that the researcher has designed excellently, there was an increase of 81.82% in knowledge gained after the intervention. The result was in congruence with the studies conducted by Kusumaninggrum & Wahyu (2018) and Butriang & Tanuchaibutra (2018).

Table 2 Comparison of Problem-Solving Ability in Math Before-Study and After-Study Test Scores of Secondary 1 (Grade 7) Students studying learning activities through the KWDL Technique Combined with BAR Model

KWDL Combined with BAR Model Learning Management	(Number of Units) n	Mean ($\bar{x}$)	Standard Deviation (s)	Computed t-value (t)	Degrees of Freedom (df)	Sig. (p-value)
Before Study	19	14.16	6.230	13.559*	18	0.0000
After Study	19	31.21	3.392			

From Table 2, the results revealed that after-study test scores of problem-solving ability in Math of Secondary 1 (Grade 7) students studying learning activities through the KWDL Technique combined with BAR Model were ($\bar{x}$ = 31.21, s = 3.392) was higher than their before-study test scores ($\bar{x}$ = 14.16, s = 6.230).

Meanwhile, the p-value of 0.000 is less than the 0.05 level of significance which leads the researcher to reject the null hypothesis that the after-study test scores were significantly higher than the before-study test scores of Secondary 1 (Grade 7) Students who learned through KWDL Technique combined with BAR Model.

This only implies that the after-study test scores of problem-solving ability in mathematics of Secondary 1 (Grade 7) students who learned through the KWDL Technique combined with the BAR Model were significantly higher than the before-study test scores at 0.05 level of significance. The result was in congruence with the studies conducted by Chaisongkram & Vanichwatanavorachai (2018); Khuankawin (2018) and Meekhamthong (2020).

Table 3 Analysis Results to compare the before-study and the after-study problem-solving ability in Math of the Secondary 1 (Grade 7) students studying learning activities through traditional

Number Student	Before Study	After Study	Increase (D)
1	11	15	4
2	20	32	12
3	14	22	8
4	12	21	9
5	13	15	2
6	25	30	5
7	10	15	5
8	24	30	6
9	11	19	8
10	8	17	9
11	11	22	11
12	9	17	8
13	16	22	6
14	14	26	12
15	15	22	7
16	20	26	6
17	8	16	8
18	7	16	9
19	11	22	11
Mean ($\bar{x}$)	13.63	21.32	7.68
S	5.262	5.427	
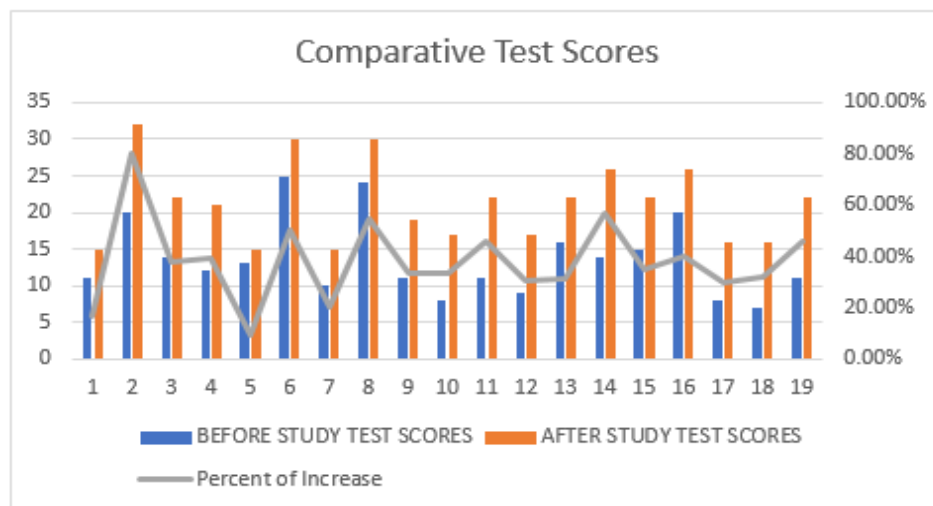
Figure 2 Comparison of the Before-Study and the After-Study Problem Solving Ability in Math of the Secondary 1 (Grade 7) students studying learning activities Traditional

From Table 3 and Figure 2, the results revealed that after-study test scores of problem-solving ability in Math of Secondary 1 (Grade 7) students studying learning activities through traditional ($\bar{x} = 21.32$, s = 5.427) were higher than their before-study test scores ($\bar{x} = 13.63$, s = 5.262).

This implies that the students performed better in the after-study test as evidenced by a slightly smaller standard deviation compared with the before-study test. In addition, the effectiveness index of 41.83% indicates that after the learning activities through traditional, there was an increase of 41.83% in knowledge gained.

Table 4 Comparison of Problem-Solving Ability in Math Before-Study and After-Study Test Scores of Secondary 1 (Grade 7) Students studying learning activities traditional

Traditional Learning Management	(Number of Units) n	Mean ($\bar{x}$)	Standard Deviation (s)	Computed t-value (t)	Degrees of Freedom (df)	Sig. (p-value)
Before Study	19	13.63	5.262	12.271*	18	0.000
After Study	19	21.32	5.427			

From Table 4, the results revealed that after-study test scores of problem-solving ability in Math of Secondary 1 (Grade 7) students studying learning activities through traditional were ($\bar{x}$ = 21.32, s = 5.427) higher than their before-study test scores ($\bar{x}$ = 13.63, s = 5.262).

Meanwhile, the p-value of 0.000 is less than the 0.05 level of significance which leads the researcher to reject the null hypothesis that the after-study test scores were significantly higher than the before-study test scores of Secondary 1 (Grade 7) Students studying learning activities through traditional. This only implies that the after-study test scores of problem-solving ability in Math of Secondary 1 (Grade 7) students who received learning by using traditional were significantly higher than the before-study test scores at 0.05 level of significance. The result of this study is in congruence with the findings of Piemsuk and Siharak (2019) who found that the after-learning management was significantly higher than before-learning management among students who learned using the traditional method at 0.05 level of significance.

Table 5 Compare problem-solving ability in Math of the Secondary 1 (Grade 7) students after learning activities through traditional and KWDL techniques combined with the BAR model

Learning Management	(Number of Units) n	Mean ($\bar{x}$)	Standard Deviation (s)	Computed t-value (t)	Degrees of Freedom (df)	Sig. (p-value)
Traditional	19	21.32	5.427	-6.739*	36	0.000
KWDL Technique Combined with BAR Model	19	31.21	3.392			

From Table 5, the results revealed that after-study test scores of problem-solving ability in Math of Secondary 1 (Grade 7) students studying learning activities through the KWDL Technique combined with BAR Model were ($\bar{x}$ = 31.21, s = 3.392) was higher than the after-study test scores of problem-solving ability in Math of Secondary 1 (Grade 7) students studying learning activities through traditional ($\bar{x}$ = 21.32, s = 5.427).

Meanwhile, the p-value of 0.000 is less than the 0.05 level of significance which leads the researcher to reject the null hypothesis that the after-study test scores of problem-solving ability in Math of Secondary 1 (Grade 7) students studying learning activities through KWDL technique combined with BAR Model were significantly higher than the after-study test scores of problem-solving ability in Math of Secondary 1 (Grade 7) students studying learning activities through traditional.

This only implies that the after-study test scores of problem-solving ability in Math of Secondary 1 (Grade 7) students who learned through the KWDL Technique combined with the BAR Model were significantly higher than the after-study test scores of problem-solving ability in Math of Secondary 1 (Grade 7) students who learned through traditional at 0.05 level of significance.   This finding is in accordance with the research results of Summart and Viriyapong (2021); Piemsuk and Siharak (2019); Rattanosot et.al. (2018); Suriyachote & Siharak (2020) and Parungao (2021).

CONCLUSIONS AND EVALUATION
The homogeneity of the experimental units used in the study cannot be denied because in the first place, all share the same characteristics, to name a few, in terms of age, grade level, and academic achievement since they are all honor graduates in their elementary education. However, the samples were divided into two groups – the experimental and the control groups. Both were administered with the same before-study test but were exposed to different techniques or methods using the learning activity designed for each group by the researcher. Hence, there was a randomization procedure that took place and the researcher can now make statistical inferences about the population from which the samples were taken.

The results of the study showed that the intervention using learning activities through the KWDL technique combined with the BAR model had an effectiveness index (EI) of 81.82% indicating an increase in knowledge gained after the intervention. It was revealed also that the two groups performed better in the after-study test as evidenced by the means, standard deviation, and the results of the t-test for two independent samples. Furthermore, it revealed that the after-study test scores of problem-solving ability in Math of Secondary 1 (Grade 7) students studying learning activities through the KWDL technique combined with the BAR Model were significantly higher than the after-study test scores of problem-solving ability in Math of Secondary 1 (Grade 7) students studying learning activities through traditional as evidenced by the p-value of 0.000 statistically tested at 0.05 level of significance. This implies that the use of the KWDL technique combined with the BAR model brings effectiveness and was helpful among Secondary 1 (Grade 7) students.

This is in accordance with the Secondary 1 (Grade 7) students specifically those who learned through KWDL technique combined with the BAR model found enjoyment and were enthusiastically solving problems in mathematics which was observed by the experimenter as well as the appreciation shown by the students on the importance of the subject matter in real life situations. Moreover, students found the use of the KWDL chart and BAR model as an innovation in learning as well as the math teachers. The use of the KWDL chart helped them become conscientious by looking closely into the information details in the given problems while the bar modeling has helped them analyze the problems better giving them visual representations of the details in the word problem to come up with the correct and precise solutions. The same attitude was very apparent on the part of the mathematics teacher who served as the experimenter. She found the learning activity to be a mathematical problem-solving ability-enhancing technique. The novelty that it conveys is sufficient enough to attain the curriculum standards. Both stakeholders became more organized which helped the students learn independently and the teacher teaches diligently. Mutual exchange of knowledge seemingly allowed students to develop new ideas and new concepts and encouraged the teachers to become more innovative and more skillful in the delivery of the subject matter. This finding is in accordance with the research results of Kusumaninggrum & Wahyu (2018) and Butriang & Tanuchaibutra (2018) in their separate studies.

This may mean that the mixture of learning activities like the KWDL and the BAR modeling may probably increase independent learning and motivation to enhance problem-solving ability that will eventually elicit desirable learning outcomes.

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The Impact of Quizlet on Teaching Pronunciation to 9th Grade EFL Students

Esra Atalan
Lecturer, Erciyes University
esraatalan@erciyes.edu.tr
ORCID: 0000-0002-8197-9278

Assoc. Prof.Dr. Gonca Subaşı[2]
Anadolu University, ELT Department of Faculty of Education
goncas@anadolu.edu.tr
ORCID: 0000-0001-7049-5940

ABSTRACT
Developing the ability to pronounce a word clearly is an essential component of oral communication. Hence, the present study aims to examine how the use of Quizlet, a digital flashcard tool, can contribute to enhancing the pronunciation abilities of 9th -grade Turkish EFL students at a state high school in Gaziantep. The study included a total of twenty-six high school EFL students as participants. The 52 target words for the study were selected from the English coursebook, skills book, and workbook specifically designed by the Ministry of Education for 9th-grade students. During the 8-week duration of the study, the Quizlet group was provided with various tasks and assignments using the different study modes available on the Quizlet platform. The participants' pronunciation of the target words was digitally recorded. The evaluation of the students' recordings was conducted by a native speaker and a native-like speaker of English. A rubric was specifically designed for the purpose of assessment, focusing on three main aspects: vowel quality, consonant quality, and word stress. To ensure the consistency and reliability of the ratings, the interrater reliability of the evaluators was calculated. By analyzing the mean scores, the overall scores of each individual word as well as the scores for segmental features of pronunciation, including vowel and consonant quality, and suprasegmental feature of pronunciation, which is word stress were examined. The findings of the study reveal that the learners in the Quizlet group performed well in the aspect of consonant quality. On the other hand, they faced challenges in the area of word stress. While the word 'trip' received the highest rating of 7.4, the word 'suggest' had the lowest rating of 4.1 in terms of mean scores for the correct pronunciation. The outcomes also indicate that teachers can gain valuable insights into learners' common errors and identify their areas of difficulty based on the mispronounced sounds.
Keywords: Digital Flashcards, Quizlet, Teaching Pronunciation, Turkish EFL High School Students

INTRODUCTION

Gaining the ability to pronounce a word clearly is a crucial component of oral communication. Even if it does not prevent communication between interlocutors by itself, it is vital to speak more intelligibly. Munro and Derwing (1995) define intelligibility by saying "the extent to which the speaker's message is actually understood by a listener" (p.76). Even though the learners have enough vocabulary knowledge, it could become a restriction because of 'mispronunciation'.

In the meantime, with its affordances and innovations in language learning and teaching, technology-enhanced language teaching has created a growing need to integrate it into pedagogical settings from researchers to teachers. It has a very crucial place in learning and teaching pronunciation. As digital tools have become more and more used in the field of foreign language teaching, technology-enhanced language instruction has become a larger trend in language education to accommodate the learning needs of the new generation of 'Digital Natives' to meet their needs of them and to ensure that they are motivated. Such that some studies have explored the effectiveness of computer-based technologies on pronunciation teaching. Golonka, Bowles, Frank, Richardon and Freynik (2012) stated that "technology made a measurable impact in FL learning came from studies on computer-assisted pronunciation training, in particular, automatic speech recognition (ASR)" (p. 70). The effect of ASR technology on the improvement of pronunciation has been investigated by many researchers. (Al-Qudah, 2012, Seferoglu, 2005). One of the software programs mentioned in the literature is MyET, also known as My English Tutor. The features of MyET are as follows (1) real-life conversations that cover audio-lingual and communicative language approaches. (2) different themes based on real-life dialogues so that learners can record dialogues and get holistic feedback: intonation, stress, and individual sounds. Liu and Hung (2016) investigated the impact of MyET on improving the pronunciation of Taiwanese learners. The learners experienced significant improvement in their scores. Another reported software program is Clear Pronunciation 2 which incorporates five topics and five related activities including suprasegmental features of pronunciation. The software is supported by three dialects: British

English, American English, and Australian English. Khoshsima, Saed and Moradi (2017) incorporated Clear Pronunciation 2 to enhance learners' pronunciation skills in Iran. The nature of the feedback improved their overall scores on intonation, connected speech, word stress, and sentence stress.

According to the literature, a considerable number of researchers and language teachers have shown a general inclination toward how they can utilize technology to give pronunciation instruction. Despite attempting to carry out many studies to find out whether technology has a very significant role in pronunciation teaching, there has been little evidence from previous research studies that it can be integrated well into classrooms (Lee, J., Jang, J., and Plonsky, L.,2015). Indeed, many studies have been interested in suprasegmental features of pronunciation (rhythm, stress, and intonation) (Thomson and Derwig, 2015). For instance, Eskenazi (1999) studied 10 native speakers of American English and 20 other participants who were speakers of other languages to investigate the effectiveness of a tool called automatic speech recognition while teaching and correcting errors of pronunciation at the suprasegmental level (intonation). The participants, however, did not show any significant improvements in pronunciation learning. Stenson, Downing, Smith, J and Smith (1992) also investigated the effectiveness of computers by analyzing suprasegmental features of pronunciation (intonation), however, Computer-Aided Pronunciation Teaching (CAPT) had little effect on intonation learning. On the other hand, findings from the meta-analysis conducted by Mahdi and Al Khateeb (2019) analyzed 20 research studies that used CAPT for pronunciation practice. Results confirmed that the effect size of CAPT on segmental features was moderate while there had been significant effect size on suprasegmental features. Additionally, a large portion of the studies applied CAPT to FL pronunciation achieved superior performance comparing traditional approaches. In contrast, it was also remarked that only four studies outlined no notable differences between the ones that used CAPT and the ones that did not.

Whilst the applications in the CAPT system are still limited and there is not a fully automatic, ready-to-use CAPT system, computer and electronic engineers in the field are exploring developing a fully automatic and ready-made system (Abdous, Facer and Yen, 2012; Moustroufas and Digalakis, 2007; Peabody, 2011). Even though recent trends and issues in technology have started to produce new instructional technologies regarding pronunciation teaching, studies conducted in the field are limited as opposed to CALL methods in the other skills of language.

Another concern is that spelling mistakes, and lack of intelligibility were noticed both by the research schools' English teachers and researcher and the students who orally stated that there was a need for pronunciation support in the current study. As the English classroom time was limited to four hours a week and the learners orally stated that they have not been engaged in a digital application before to learn English, a digital tool was preferred both to meet the needs of learners and to meet the need of vocabulary teaching. In response to these problems, Quizlet digital flashcard application was considered suitable for this study providing the students with opportunities to work individually by practicing and listening to the words during and after the lesson with different activities by reinforcing those activities with games, which is assumed to motivate and offer engaging learning environment by providing sufficient time for the learners.

In Turkish EFL contexts, many research studies were conducted to investigate the effectiveness of Quizlet on vocabulary learning (Bilcan, 2019; Çakır, 2019; Çınar and Arı, 2019; İnci, 2020). The main aim of these research studies was to test only the effectiveness of Quizlet on vocabulary learning. However, these research studies did not provide any results in terms of pronunciation development. Therefore, the present study aimed to shed light on the probable effect of Quizlet on pronunciation improvement as a new dimension to the current study.

To sum up, preceding studies suggested the acceptance of Quizlet in various implementations. It has become apparent that further research on the effect of digital tools on pronunciation improvement is needed. Especially, none of the preceding studies explored the effect of the Quizlet on learners' pronunciation development. For this reason, the purpose of the present study was to shed light on the effects of Quizlet digital web tool on 9th -grade EFL learners' pronunciation development. The research question is as follows:
1- What is the effect of Quizlet on the 9th -grade EFL students' pronunciation?
a- What are the words commonly mispronounced and pronounced correctly by these students after using Quizlet?

METHODOLOGY
a- Participants, Setting and Research Design
The objective of the study was to examine whether a difference appears in learners' pronunciation skills on the production level as a result of exposure to audio from Quizlet application. 26 students aged 14-15 years took part in the study. The participants of the study were chosen from the researcher's teaching classes using a convenience sampling method. The Quizlet group presented tasks and assignments through Quizlet study modes. To ensure the

homogeneity of the participants in terms of proficiency level, the main coursebook was investigated and a proficiency test was conducted. The subjects were homogenous in terms of both their age and proficiency. As a part of their compulsory curriculum, the participants took four hours of English instruction per week, and the main coursebook used in the class was 'Teen Wise', which consisted of 10 units covering integrated skills in alignment with the principles of CEFR. The focus of the study revolves around the digital flashcard program called Quizlet as a teaching method to enhance learners' pronunciation. The research was a quasi-experimental research design. The quantitative method of research was used in this study.

b-   Data Collection Procedure
The study lasted eight weeks and the participants were asked to read the 52 target words aloud in a sentence while the instructor was recording them at the end of the week. First, a vocabulary familiarity test was administered to all 9th -grade students to identify the known words and exclude them. 52 unknown words were selected from out of three target units. In the following week, the participants underwent training to enhance their familiarity with the Quizlet app. At the end of the final week, the participants were requested to orally read the target words in sentences while being recorded by the researcher.

Figure 1 shows a screenshot of the browser-based version of the Flashcard page. The Flashcard page is where learners review the words through definitions, pictures, or audio. It gives options to determine which side(s) of the cards can be shown. ('flip or flow'). Learners can access the other side of the card by clicking when it is chosen to show only one side of the card. They can also hear the pronunciation of the word (audio on/off).

Figure 1: A screenshot of the flashcard page

c-   Design of the Evaluation Form for the Pronunciation Rubric
The rubric was designed for the pronunciation assessment when the recordings of the participants finished. The rubric was derived from an evaluation form for pronunciation conducted in a master thesis to evaluate a total sample of 7380 scores (Aktuğ, 2015). A rubric was formed based on two aspects after evaluation of many speaking rubrics in the literature, and an expert opinion from the ELT department and English teachers' opinions from the research school were taken when designing the evaluation form of the pronunciation rubric. Firstly, sentence-level quality items (intonation, linking, grammar, sentence stress) and items related to oral communication assessment (presentation length, structure, speaking skills, and organization) were excluded from the study since only word-level pronunciation was evaluated and there was no special training for given skills in the current study. A native speaker of English and a native-like speaker listened to each target word two times. Each rating was on a 10-point scale from 1-poor to 10-excellent (See Appendix B for an example pronunciation rubric).

d-   The Implementation of the Voice Recording Test
 Participants' responses to the target words were recorded digitally with a special microphone so that there could not be any misjudges or doubts between the raters. The recording was analyzed by a native speaker of English secondary school English teacher who has been teaching English for 8 years and lived and studied abroad. The school library was preferred to maintain silence and decrease noise levels and the best sound insulation. Twenty-six 9th participants were recorded and evaluated with 52 target words in terms of segmental and suprasegmental features of pronunciation. Every 52 words were not given isolation to prevent any feeling of stress of the upcoming word. The target example sentences were received from Cambridge online dictionary on https://dictionary.cambridge.org/tr/, https://www.merriam-webster.com/ and Oxford online dictionary on https://www.oxfordlearnersdictionaries.com/ and were modified according to the level of students. Some examples of the sentences that the participants encountered during the recording were provided in Table 1.

Table 1. The target words and the sentences for recording

No	Sentences
1	I love the ancient sites of Turkey
2	It is almost 2 feet in height.

Segmental features mean consonant and vowel sounds. In addition, stress was analyzed under suprasegmental features of pronunciation. Since they were beginner levels and as the researcher followed the curriculum, it was decided that it would be impractical to test all other suprasegmental features. Hahn (2004) indicates that improperly stressed words and phrases can cause confusion and misunderstanding. Hence, to impede a delay misunderstanding and confusion of participants' speaking stress were analyzed in the study.

e-   Data Analysis
Raters
With an intent to raise the reliability of scoring for the voice recordings of the words, the recordings of the participants were rated by another native speaker of English who is a secondary school English teacher and has been teaching English for 8 years at a private school in Kayseri. Moreover, the recordings were scored by another native-like teacher to assure the raters score similarly. Inter-rater reliability was measured between the raters. The reliability between the raters was determined as 0.977 (See Table 2.). The reliability was calculated by comparing the scores of the raters.

Table 2. Cronbach's alpha statistics for raters

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.976	0.977	2

FINDINGS
To evaluate the pronunciation of learners, a specifically designed rubric on a scale from 1 to 10 was utilized. A rubric was formed based on two aspects after evaluation of many speaking rubrics in the literature and an expert opinion from the ELT department and English teachers' opinion from the research school were taken and designed. The rubric was divided into 3 scales portraying the segmental features (vowel quality, consonant quality) and suprasegmental features of the pronunciation (word stress) of the 52 target words. The statistical analysis of the pronunciation qualities (vowel, consonant and word stress) is displayed in Table 3.

Table 3. Descriptive statistics of vowel, consonant quality, and word stress

Total Descriptive Statistics						
	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Vowel quality	1352	2	9	6808	5,0	1,4
Consonant quality	1352	2	9	6969	5,2	1,4
Word stress	1352	2	9	6662	4,9	1,3
Valid N (listwise)	1352					

In the first scale, consonant quality showed the highest mean of 5.2. Then, it was followed by vowel quality (M=5.0) and word stress (M=4.987, SD=0.205) respectively. From the table, it might be seen that by far the greatest number was for consonant quality. In general, the learners were the most successful in consonant quality and they were the least successful in word stress. The success at the vowel quality existed between the consonant quality and word stress.

a-   The Scores of the Individual Words
The mean scores of each target word were analyzed by averaging the consonant and vowel quality and word stress of the word to find out the difference between the scores of each word. The descriptive statistics of the average scores for each word are shown in Table 4.

Table 4. Descriptive statistics of average scores of each word

Words	N	M	SD	SE	Min	Max	Words	N	M	SD	SE	Min	Max
Trip	26	7,4	1,1	0,2	5	8,7	**Remote control**	26	5,0	1,0	0,2	3	6,7
Architecture	26	5,9	0,9	0,2	3,7	8	**Check-in**	26	5,0	0,7	0,1	4	6,3

Word	N	M	SD	SE	Min	Max	Word	N	M	SD	SE	Min	Max
Delay	26	5,8	0,9	0,2	3,7	7,3	**Soft drinks**	26	5,0	1,1	0,2	3	7,3
Gate	26	5,7	1,3	0,2	3,7	7,7	**Entertain**	26	5,0	0,8	0,2	3,7	7
Refuse	26	5,7	0,9	0,2	4	7,7	**Masterpiece**	26	4,9	0,7	0,1	3,3	6
Port	26	5,6	1,4	0,3	3	8,3	**Satellite dish**	26	4,9	0,7	0,1	3,7	6,3
Tower	26	5,6	0,6	0,1	4,3	6,7	**Civilization**	26	4,8	0,7	0,1	3,3	6
Board	26	5,6	1,2	0,2	3,3	8,3	**Tradition**	26	4,8	0,6	0,1	3,7	6
Accept	26	5,6	1,0	0,2	4	7,3	**Structure**	26	4,8	0,6	0,1	3,7	6
Turn on	26	5,5	1,1	0,2	3,7	7,7	**Height**	26	4,8	0,5	0,1	4	6
Historic	26	5,4	0,8	0,2	3,7	6,7	**Farewell party**	26	4,8	0,8	0,2	4	6,7
Prediction	26	5,3	0,8	0,2	3,7	6,7	**Heritage**	26	4,8	0,7	0,1	3,3	6
Guidebook	26	5,3	0,7	0,1	3,7	6,7	**Length**	26	4,7	0,8	0,2	2,7	6
Username	26	5,3	1,0	0,2	3,7	7,7	**Invitation**	26	4,6	0,6	0,1	3,3	6
Station	26	5,2	1,0	0,2	3,7	7,3	**Graduation party**	26	4,6	0,6	0,1	3,7	6
Internet access	26	5,2	0,5	0,1	4,3	6	**Disagree**	26	4,6	0,6	0,1	3,3	6
Security	26	5,2	0,6	0,1	4	6,7	**Opening party**	26	4,6	0,5	0,1	3,7	5,7
Permit	26	5,2	0,8	0,2	4	6,7	**Souvenir**	26	4,5	0,5	0,1	3,7	5,3
Century	26	5,2	0,6	0,1	4,3	6,7	**Reject**	26	4,5	0,6	0,1	3,3	5,7
Addict	26	5,1	0,6	0,1	4	6,3	**Statue**	26	4,5	0,8	0,2	3,3	6,3
Candle	26	5,1	1,0	0,2	3,3	7,7	**Agree**	26	4,5	0,6	0,1	3,3	5,3
Log in	26	5,1	0,9	0,2	4	7	**Housewarming party**	26	4,5	0,6	0,1	3,3	6
Documentary	26	5,1	0,8	0,2	3,3	6,7	**Underground**	26	4,4	0,6	0,1	3,3	6
Follow the news	26	5,1	0,7	0,1	4	6,3	**Ancient**	26	4,4	0,4	0,1	3,7	5,3
Baggage	26	5,1	0,9	0,2	4	6,7	**Mosque**	26	4,4	0,7	0,1	3	6
High Definition	26	5,0	0,5	0,1	4	6,3	**Suggest**	26	4,1	0,5	0,1	3,3	5

The word 'trip' had the highest rate of 7.4 regarding the mean score and the maximum score was 8.7 out of 10 for this word. The word 'suggest' had the lowest rate of 4.1 regarding mean scores while the maximum score was 5 out of 10 for 'suggest'. The overall quality rates and the statistics of each score of each word are given in Tables 5, 6 and 7.

Table 5. Descriptive statistics of vowel quality

Words	N	M	SD	SE	Min	Max	Words	N	M	SD	SE	Min	Max
Trip	26	7,4	1,1	0,2	4	9	**Satellite Dish**	26	5,1	1,1	0,2	3	8
Historic	26	6,4	1,3	0,2	4	8	**Guidebook**	26	5,1	1,2	0,2	3	7
Delay	26	6,3	1,3	0,3	4	8	**Structure**	26	5,0	1,2	0,2	3	7
Refuse	26	6,0	1,2	0,2	4	8	**Check-İn**	26	5,0	1,1	0,2	3	7
Turn On	26	6,0	1,6	0,3	3	8	**Century**	26	5,0	0,8	0,2	3	7
Port	26	5,9	1,7	0,3	3	9	**Civilization**	26	4,9	1,1	0,2	3	7
Length	26	5,8	1,8	0,3	2	8	**Remote Control**	26	4,8	1,7	0,3	2	8
Architecture	26	5,7	1,1	0,2	4	8	**Masterpiece**	26	4,8	1,3	0,2	3	7
Gate	26	5,7	1,5	0,3	4	8	**Invitation**	26	4,8	1,0	0,2	3	7
Permit	26	5,7	1,6	0,3	3	9	**Farewell Party**	26	4,7	1,0	0,2	3	7
Station	26	5,7	1,2	0,2	4	8	**Tradition**	26	4,7	1,3	0,3	3	7
Accept	26	5,7	1,3	0,3	3	9	**Statue**	26	4,5	1,2	0,2	3	7
Board	26	5,6	1,5	0,3	3	8	**Reject**	26	4,5	1,1	0,2	3	6
Heritage	26	5,5	1,1	0,2	4	8	**Entertain**	26	4,5	1,3	0,3	3	7
Soft Drinks	26	5,4	1,6	0,3	3	8	**Opening Party**	26	4,4	1,0	0,2	3	6

Words	N	M	SD	SE	Min	Max	Words	N	M	SD	SE	Min	Max
Follow The News	26	5,4	1,3	0,3	3	8	Graduation Party	26	4,3	1,4	0,3	2	7
Prediction	26	5,3	1,3	0,3	3	8	Agree	26	4,3	1,0	0,2	2	6
Log İn	26	5,3	1,3	0,2	3	7	Housewarming Party	26	4,2	1,0	0,2	2	6
Documentary	26	5,3	1,8	0,4	2	8	Suggest	26	4,2	0,8	0,2	3	6
High Definition	26	5,2	0,7	0,1	4	7	Underground	26	4,1	1,0	0,2	2	6
Security	26	5,2	1,2	0,2	3	8	Ancient	26	4,0	0,9	0,2	2	6
Username	26	5,2	1,7	0,3	2	8	Disagree	26	4,0	0,9	0,2	3	6
Candle	26	5,2	1,5	0,3	2	8	Tower	26	4,0	1,1	0,2	2	7
Addict	26	5,2	1,1	0,2	3	7	Souvenir	26	3,8	1,2	0,2	2	6
Baggage	26	5,1	1,0	0,2	3	7	Mosque	26	3,7	1,1	0,2	2	6
Internet Access	26	5,1	1,3	0,3	3	7	Height	26	3,4	0,9	0,2	2	5

According to the mean scores, out of 26 participants, the word 'height' was observed as the most challenging word for vowel pronunciation quality having a mean of 3.4. On the other hand, 'mosque' and 'souvenir' also could be categorized as problematic words as having a mean of 3.7 and 3.8 respectively. The word 'trip' was the most properly pronounced one with an overall 7.4 mean score. The words 'historic and delay' were the next words pronounced correctly with an overall 6.4 and 6.3 respectively. (See Table 5.)

Table 6. Descriptive statistics of consonant quality

Words	N	M	SD	SE	Min	Max	Words	N	M	SD	SE	Min	Max
Trip	26	7,5	1,2	0,2	5	9	Candle	26	5,0	1,3	0,3	2	8
Height	26	7,2	0,8	0,2	6	8	Documentary	26	5,0	1,3	0,3	3	8
Tower	26	6,4	1,1	0,2	4	8	Permit	26	5,0	1,1	0,2	3	7
Delay	26	6,2	1,3	0,3	3	8	Underground	26	5,0	1,3	0,3	3	7
Gate	26	5,9	1,5	0,3	4	8	Follow the news	26	5,0	1,2	0,2	3	7
Accept	26	5,9	1,3	0,3	4	8	High Definition	26	5,0	0,8	0,2	4	7
Century	26	5,8	0,9	0,2	4	8	Refuse	26	5,0	1,4	0,3	3	8
Architecture	26	5,8	1,5	0,3	3	9	Farewell party	26	5,0	1,0	0,2	4	7
Disagree	26	5,8	1,0	0,2	4	8	Masterpiece	26	4,9	1,3	0,3	2	7
Board	26	5,7	1,3	0,3	3	8	Graduation party	26	4,8	1,0	0,2	3	7
Port	26	5,6	1,8	0,4	2	9	Soft drinks	26	4,8	1,4	0,3	2	8
Mosque	26	5,5	1,1	0,2	4	8	Tradition	26	4,8	1,3	0,3	3	7
Prediction	26	5,3	1,2	0,2	3	8	Check-in	26	4,8	1,3	0,2	3	7
Station	26	5,3	1,4	0,3	2	8	Ancient	26	4,7	0,8	0,2	3	6
Internet access	26	5,3	1,1	0,2	3	7	Historic	26	4,7	1,3	0,3	2	7
Remote control	26	5,3	1,3	0,3	3	7	Satellite dish	26	4,7	1,0	0,2	3	7
Turn on	26	5,3	1,4	0,3	3	8	Structure	26	4,7	1,1	0,2	2	7
Username	26	5,3	1,5	0,3	3	8	Souvenir	26	4,6	0,8	0,2	3	6
Civilization	26	5,3	1,1	0,2	4	7	Statue	26	4,5	1,5	0,3	2	7
Addict	26	5,2	1,1	0,2	3	7	Invitation	26	4,5	1,2	0,2	3	6
Agree	26	5,2	1,5	0,3	2	8	Reject	26	4,3	1,1	0,2	3	6
Entertain	26	5,2	1,2	0,2	3	7	Opening party	26	4,3	1,2	0,2	2	7
Baggage	26	5,2	1,7	0,3	2	8	Heritage	26	4,2	0,9	0,2	3	6
Guidebook	26	5,2	0,8	0,2	4	7	Housewarming party	26	4,2	1,0	0,2	3	6
Security	26	5,2	1,1	0,2	3	7	Suggest	26	4,0	0,9	0,2	2	6
Log in	26	5,1	1,2	0,2	3	8	Length	26	3,8	1,1	0,2	2	6

The one which was the most mispronounced was the word 'length', the average mean score of the participants was 3.8. The words 'suggest housewarming party, heritage and opening party' with a mean score of 4.0, 4.2, and 4.3 followed respectively. According to the statistical analysis shown in Table 4., the word 'trip' is indicated as the most properly pronounced word with an overall mean of 7.5. Given the overall results, the word 'height' was the second properly pronounced word with a mean score of 6.4. (See Table 6.)

Table 7. Descriptive statistics of word stress

Words	N	M	SD	SE	Min	Max	Words	N	M	SD	SE	Min	Max
Trip	26	7,3	1,4	0,3	4	9	**Baggage**	26	4,9	1,5	0,3	3	7
Tower	26	6,4	1,0	0,2	5	8	**Addict**	26	4,9	0,9	0,2	3	7
Refuse	26	6,0	1,2	0,2	4	8	**Satellite dish**	26	4,8	1,7	0,3	2	9
Architecture	26	6,0	1,2	0,2	4	8	**Log in**	26	4,8	1,4	0,3	3	7
Guidebook	26	5,7	1,2	0,2	4	8	**Follow the news**	26	4,8	1,0	0,2	3	7
Gate	26	5,5	1,4	0,3	3	7	**Permit**	26	4,8	1,4	0,3	3	8
Board	26	5,5	1,7	0,3	3	9	**Structure**	26	4,8	1,3	0,2	3	7
Username	26	5,3	1,5	0,3	3	8	**Farewell party**	26	4,8	1,1	0,2	3	7
Port	26	5,3	1,6	0,3	3	8	**High Definition**	26	4,8	0,8	0,1	4	6
Prediction	26	5,3	1,1	0,2	4	7	**Station**	26	4,7	1,3	0,3	2	8
Check-in	26	5,2	1,2	0,2	3	7	**Soft drinks**	26	4,7	1,4	0,3	2	8
Internet access	26	5,2	1,1	0,2	3	7	**Century**	26	4,7	0,7	0,1	4	6
Security	26	5,2	1,0	0,2	4	7	**Heritage**	26	4,6	1,3	0,3	2	7
Entertain	26	5,2	1,5	0,3	3	8	**Reject**	26	4,6	1,1	0,2	3	7
Turn on	26	5,1	1,6	0,3	2	8	**Graduation party**	26	4,5	0,9	0,2	3	6
Accept	26	5,1	1,5	0,3	2	7	**Invitation**	26	4,5	0,9	0,2	3	6
Delay	26	5,1	1,3	0,3	3	7	**Length**	26	4,4	0,8	0,1	3	6
Souvenir	26	5,1	1,3	0,3	3	7	**Statue**	26	4,4	1,1	0,2	3	6
Masterpiece	26	5,0	1,0	0,2	3	7	**Ancient**	26	4,3	0,7	0,1	3	6
Historic	26	5,0	1,4	0,3	2	8	**Civilization**	26	4,3	1,1	0,2	2	6
Candle	26	5,0	1,1	0,2	3	7	**Suggest**	26	4,2	0,7	0,1	3	5
Opening party	26	5,0	1,2	0,2	3	7	**Agree**	26	4,0	0,8	0,2	3	5
Housewarming party	26	5,0	1,2	0,2	3	7	**Underground**	26	4,0	0,9	0,2	3	6
Tradition	26	5,0	1,2	0,2	3	7	**Disagree**	26	3,9	1,0	0,2	3	6
Documentary	26	4,9	1,1	0,2	3	7	**Mosque**	26	3,9	1,4	0,3	2	8
Remote control	26	4,9	1,4	0,3	3	7	**Height**	26	3,8	0,9	0,2	2	5

On the ground of the stress rules in Turkish, the word stress was analyzed on the vowels, not the sentence. One word indicates only one stress, and it could be stressed only by the vowels. As the result was considered, it was understood that the most problematic word regarding word stress was 'height'. It scored only 3.8 mean scores. The second challenging words concerning their stress were 'mosque and disagree' averaging only 3.9. When the results were considered, it was depicted that the word 'trip' had the highest mean score, and the word 'tower' ranked as the second one with an overall mean of 6.4. (See Table 7.)

Ultimately, the participants were successful at the consonant quality and least successful at word stress as displayed in Table 2. While the most well-pronounced target word was 'trip', the word 'suggest' had the lowest mean scores of all 52 target words. As seen in Table 3. 'trip' scored 7.4. for the vowel pronunciation quality percentage, 7.5 for the consonant quality, and averaged 7.3 for the word stress. In addition, the word 'height' appeared as the least successful word for the vowel quality and 'length' averaged only 3.8 for the consonant quality. As seen in Table 7., the word 'height' also scored only 3.8 for the word stress.

CONCLUSION & DISCUSSION

The present research was intended to explore whether the Quizlet digital web tool impacts 9th-grade students' English pronunciation skills or not. The Quizlet group learners heard each target word through Quizlet Flashcard mode which offers the 'Audio on' button. The 'Audio on' option was accessible for all Quizlet study modes. Although the Quizlet application did not offer any pronunciation scoring system, the researcher provided feedback on the pronunciation of the words when needed.

The statistical analysis of the scores revealed that the participants achieved better scores in consonant quality with a mean of 5.2 and scored slightly lower in vowel quality (M=5.0). The learners were least successful in the suprasegmental feature which is the word stress averaging 4.9. As observed in Table 4. according to the average scores of each word, the word *trip* had the highest mean score of 7.4 having an 8.7 maximum score out of 10. On the other hand, the word *suggest* scored only 4.1 having a 5 maximum score out of 10.

A-Vowel Quality

The present study identified five problematic words for the 9th grade Turkish EFL learners that are: height /haɪt/, mosque /mɒsk/, souvenir /ˌsuːvənˈɪər/, tower /taʊər/, disagree /ˌdɪsəˈɡriː/ (See Table 5.).
/aɪ/:
It is explicit that /aɪ/ was the most problematic vowel to produce in the word height. Since the Turkish language does not have a diphthong except for borrowed words and the Turkish dialects, the learners replace /aɪ/ diphthong with a vowel /e/.
/ɒ/:
The second commonly mispronounced vowel sound was /ɒ/ for the word 'mosque'. The learners replaced /o/ instead of /ɒ/. The sound systems' differences between Turkish and English phonology prevent learners to distinguish the correct sound. Since the English vowel system is unsteady (Cruttenden, 1994), each /o/ vowel is pronounced differently as seen in the words prove, come, and alone.
/uː/, /ə/, /ɪə/:
The third common pronunciation error was the word 'souvenir'. The participants substituted /o/ for /uː/ and /e/ for /ə/ as they pronounce their native language. Since the Turkish language has a lack of diphthongs, the participants tended to replace /ɪə/ with vowel /ɪ/.
/a/, /ʊə/
The fourth common vowel error was the /a/, /ʊə/ sound in the word 'tower'. The vowel /a/ was pronounced as /o/ in its written form. Turkish learners tend to pronounce the words in their written form due to "the mother tongue's influence" (Aktuğ, 2015: p. 111).
/ə/, /iː/
The last commonly mispronounced word in terms of its vowel sound was 'disagree' /ˌdɪsəˈɡriː/. The participants used the short form of the second vowel iː instead of the long form. Despite the English phonology, there are no short or long vowels in Turkish phonology.

B- Consonant Quality

The most problematic five words regarding consonant quality were as follows: length /leŋθ/, suggest /səˈdʒest/, housewarming party /ˈhaʊs. wɔː.mɪŋ/ /ˈpɑːti/, heritage /ˈherɪtɪdʒ/, opening party /ˈəʊpənɪŋ/ /ˈpɑːti/, and reject /rɪˈdʒekt/. The challenging phonemes are respectively, /θ/, /dʒ/, /ŋ/. (See Table 6.)
/θ/
The first problematic consonant sound was /θ/ that does not exist in Turkish phonology as displayed in Table 6. The participants replaced it with /t/. As Kaçmaz (1993) provided results in support of this finding, the researcher suggested that 46% of his Turkish EFL learners did not pronounce the /θ/ sound. Varol (2012) also concluded that the English interdental consonants cause difficulty due to the absences in the mother tongue of the learners.
/dʒ/
The second challenging consonant that posed a serious problem was the /dʒ/ phoneme for the suggest, heritage, and reject. While the word 'suggest' had a mean of 4.0, the words heritage and reject had a mean of 4.2 and 4.3 respectively. Even though the Turkish language has the same affricative consonant, it is not seen at the final position. Hence, the participants replaced it with other sounds.
/ŋ/
The final challenging words were 'housewarming and opening party. They had an average mean of score 4.3 and 4.2 respectively. When the Turkish and English consonant systems compared, the nasal sound /ŋ/ is one of the differences. The nasal sound was pronounced as plosive /k/ by the participants.

C- Word Stress

Thompson (2002) indicates that the rhythmic pattern of English, with its stretched-out syllables and hurried unstressed syllables with their reduced vowels, is unusual and difficult for Turkish EFL learners. No matter how

the learners pronounce the segmental features correctly when the learners put the stress in the wrong syllable, that results in communication breakdown (Celce-Murcia, Brinton and Goodwin, 2008). Word stress usually exists on the last syllable in the Turkish language. Regardless of the length of the word and the weight of the syllables, Turkish has a simple rule to apply, unlike English. In the current study, the word stress was analyzed at the word level. In the nature of English stress structure, only the vowels can be stressed and only one stress exists in one word.

According to the results of the current study, common word stress errors committed by the 9th -grade EFL learners were as follows: height /haɪt/, mosque /mɒsk/, disagree /ˌdɪsəˈɡriː/, underground /ˈʌndəɡraʊnd/, agree /əˈɡriː/, suggest /səˈdʒest/ (See Table 7.).

height /haɪt/

According to Table 7. which demonstrates the statistics of the word stress scores, it was observed that height was the most problematic word regarding word stress having a mean of 3.8. Since the participants misplaced the diphthong which is /aɪ/ for this word and put /e/ instead of it and there is only one syllable, the learners put the stress on the first syllable /h/ or last syllable /t/. The main reason is that they mispronounced the vowel as seen in Table 4. The word 'height' was investigated as the most problematic word in terms of vowel quality.

mosque /mɒsk/

The next commonly made mistake was, with a mean of 3.7, there is the word mosque /mɒsk/. As in the case of the word height /haɪt/, the participants mispronounced the vowel /ɒ/ by replacing /o/. They failed to put the stress on the right place assuming that the word was two-syllable as they read in Turkish.

disagree /ˌdɪsəˈɡriː/

The other second challenging word in terms of its stress was disagree /ˌdɪsəˈɡriː/. It has an overall 3.9 mean score. In Turkish phonology, there are not any long or short vowels, and the stress is on the first syllable for this word. Hence the participants mispronounced the vowel /iː/ and replaced it with pure /i/. The word was pronounced by participants like a two-syllable word.

underground /ˈʌndəɡraʊnd/

The third problematic word was underground /ˈʌndəɡraʊnd/. It has an overall 4.0 mean score as displayed in Table 4.32. The stress of the word underground is on the first syllable starting with the vowel ˈʌ. However, the participants who mispronounced the first vowel /u/, /e/, and also /ou/ sound failed to put the stress in the right place.

agree /əˈɡriː/

The fourth problematic word in terms of its stress was agree /əˈɡriː/ as displayed in Table 5. The participants averaged 4.0 overall. The stress is on the second syllable here /ˈɡriː/ starting with the consonant /g/. The participants already mispronounced the /a/ sound, and the stress has been lost in the word.

suggest /səˈdʒest/

The last problematic word that could not be stressed correctly was the word suggest /səˈdʒest/. The word 'suggest' also has one of the problematic phonemes as observed in vowel quality analysis. The participants struggled to pronounce the /u/ sound as vowel /ə/. The stress is on the second syllable starting with the consonant /dʒ/. However, the participants who mispronounced the vowel /u/ put the stress in the wrong place.

The results of the analysis of the participants' pronunciation scores to find out the effect of Quizlet on their pronunciation provided full support for the errors that Turkish EFL learners had difficulties with. The findings are supported by Aktuğ (2015), Saka (2015), Türker (2010), Çelik (2008) and Kaçmaz (1993). In their studies, Saka (2015); Çelik (2008) and Türker (2010) counted the voiceless interdental fricative /θ/ as the phoneme that Turkish learners have difficulty with most. Similarly, the phoneme /ŋ/ was also found as a problematic consonant phoneme in Türker's study (2010). The affricate sound /dʒ/ was determined as the second challenging phoneme in the present study. This result is in line with the findings of the study which claims that the phoneme /dʒ/ is one of the problematic phonemes of English that lead to confusion for Turkish EFL learners (Aktuğ, 2015).

Another result arose from the study that /aɪ/, /ɒ/, /uː/, /ə/, /ɪə/, /a/, /ʊə/, /iː/ were determined as phonemic mistakes in terms of vowel quality. This result is in line with the findings of studies confirming that /ɒ/, /ə/, /ʊə/, /aɪ/, /ɪə/, /a/ appeared to be among the most problematic sounds that Turkish learners mispronounced (Aktuğ, 2015; Bekleyen, 2011; Türker, 2010).

Even though there have been studies focused on the effects of Quizlet on vocabulary teaching-learning in particular (Bilcan, 2019; Franciosi, 2017; İnci, 2020; Lander, 2016; Özer and Koçoğlu, 2017), none of these studies investigated the effect of the Quizlet digital tool in terms of pronunciation skill. Even though the age factor to learn a target language is seen to have a prominent role in the improvement of pronunciation (Piper and Cansin, 1988; Thompson, 1991) and insufficient focus on pronunciation in Turkey's foreign language education context (Aktuğ, 2015), listening and spelling the target words through Quizlet study modes reinforced memorization of spoken forms of the words as stated by the majority of the participants in the interviews.

Taking into consideration participants' age to start learning English, the limited duration of lessons (40 minutes each) and restricted amount of feedback on pronunciation given to each participant from middle school to high school due to time constraints, Quizlet training in the current study gave insight on determining which sounds they had difficulties and they scored well to provide appropriate training for the participants even though the software is not designed specifically for pronunciation training.

Neri, Mich, Gerosa and Giuliani (2008) found that a computer-assisted pronunciation training (CAPT) system improved young learners' pronunciation compared to regular class teacher-oriented training. Similarly, other CAPT software programs were investigated to improve the pronunciation skills of learners. Comeau (2011) investigated the impact of EnglishCentral on EFL college learners. The learners indicated that the software was fun, useful, and engaging despite the ineffective scoring system of the tool. Alternatively, Baradaran and Davvari (2010) expressed that Pronunciation Power 2 had a positive impact on EFL learners' pronunciation with respect to its feedback feature. Similar results were concluded by Khoshsima, Saed and Moradi's research study (2017) that Clear Pronunciation 2 improved participants' intonation, connected speech, word stress, and sentence stress, and the EFL learners added that the tool was helpful and practical to use. Other than that, the effect of Automated Sound Recognition (ASR) technology was incorporated into pronunciation teaching (Seferoğlu, 2005). One of the well-known ASR software MyET provides holistic feedback to its users on different pronunciation features. Liu and Hung (2016) revealed that MyET was an effective tool by instructing users to record real-life dialogues. According to the results of the study, the pronunciation scores of the learners' improved significantly. Unlike Quizlet software, MyET supports users with conversations and dialogues, however, words are given isolated and without a context in the Quizlet tool. Still, in the current study, the researcher inserted sentences into the flashcards during the intervention, and the target words were recorded at a sentence level as in the way Liu and Hung (2016) addressed the target words in their study. Celce-Murcia, Bret et al., (1996) also suggested giving the words in a context instead of in isolation enlarges learners' knowledge of pronunciation.

Given the fact that Quizlet is a digital flashcard tool and differs from given ASR and CAPT software programs, it still includes the spoken form of the words. Regarding its deficiencies, an instructor can create study sets to enhance learners' pronunciation skills in the segmental aspect. More precisely, the Quizlet software with its engaging environment positively affected learners' attitudes toward improving their pronunciation regardless of the short time frame of 8 weeks. The analysis of the semi-structured interviews endorsed these findings. According to the interview results, learners indicated that Spell study mode and the Audio button helped their pronunciation. It was also reported that they increased their scores in the post-Orthography Productive test that listened and wrote correct pronunciation. As supported by Mayer's Dual Coding Theory (2005), the Quizlet application enabled them to process information through auditory and visual channels.

Still, it is a fact that there is a need for improvements in the nature of feedback and the recording of voice. Additionally, an eight-week time period is relatively short to assess the overall improvement of pronunciation. However, it is noteworthy that the Quizlet training helped determine 9th-grade learners' problems with individual phonemes. Like aforementioned studies and the present study's interview results support that educational technology in pronunciation teaching motivates learners. This is significant, as it presents teachers and administrators with a rationale for increasing the use of digital technology tools to teach pronunciation, as they are considered positively by the Quizlet group learners. On the other hand, a teacher needs to keep track of learners' common pronunciation errors and give instruction on both segmental and suprasegmental levels for a good command of pronunciation by evaluating a digital technology before implementing it to decide whether it is an answer for learners' needs.

IMPLICATIONS

All in all, in countries like Türkiye in which learners have limited opportunities to have English native speakers' input. Hence, another study mode with feedback on pronunciation would make a huge impact on EFL learners, that is to say, the teachers and the material designers should take these deficiencies for granted. the study uncovers the most problematic sounds for the 9th -grade Turkish EFL learners. Learners and teachers who are in the same level of EFL environment can benefit from the implications. The teachers can be fully aware of learners' common errors and be conscious of learners' difficulties. This enables teachers to be cautious of learners' pronunciation and makes the teachers eliminate fossilized pronunciation errors. Additionally, being cautious about pronunciation errors and difficulties that the learners struggle with makes learners more careful about their pronunciation. As put forward by Binturki (2001); Derwing (2003); and Mettler (1989) communication breakdown can be prevented when the students become more cautious about pronouncing words better. When considered from this point of view, the needs of the learners will be met with pronunciation exercises provided by the teachers. Especially high school teachers can get benefit from the results of this thesis in terms of pronunciation teaching. After

implementing Quizlet for 9th-grade learners to investigate the commonly mispronounced words, it was understood that some remedies should be taken into consideration. From the pedagogical perspective, making use of CAPT or with the help of tools like Quizlet in the classrooms can be a gateway to practicing pronunciation, but it is not always possible to integrate into real classrooms. Hence, firstly, the most crucial problem that should be dealt with urgently is the revision of the coursebook. Currently, English is 4 hours per week for the 9th-grade number of the classes is insufficient to dedicate sufficient time for pronunciation. Priority is on the other language areas.

According to Aktuğ's (2015) investigation of the reasons for the common pronunciation errors of secondary level students, the teachers put forward that insufficient coursebooks and insufficient curriculum content are one of the main problems of pronunciation errors. The English coursebooks only have one part for pronunciation skills which makes it hard to teach and improve the existing level of the learners or to emphasize the fossilized errors. On the other hand, according to the results and as the learners stated orally in the current study, pronunciation education should be a prerequisite for EFL learners. The curriculum and the coursebooks can be revised or redesigned by policymakers, curriculum designers, and material developers. Recently, the Ministry of Education has agreed that the assessment of English examinations should be done for each skill, and it should not be conducted only on paper. The teachers should benefit from this opportunity and during a speaking examination based on their learners' needs, they can give individual pronunciation instruction and include diagnostic feedback on pronunciation. Considering the infrastructures of their schools CAPT and ASR software such as MyET, EnglishCentral, Clear Pronunciation 2, and Pronunciation Power 2 can be augmented by using voice recording or recognition tasks. In addition, other presentation applications can be implemented. Consequently, the new directions in pronunciation teaching currently have been employing Computer-assisted instructional technology, and some other different language teaching techniques such as drama, psychology, or speech pathology (Celce-Murcia et al. 2010) are applied for pronunciation teaching.

Another implication of the study might be related to audiobooks. As Quizlet offers for learners, learners should be supported with audio-visual content adding to the pronunciation studies when the coursebook is revised. Audiobooks can be integrated into classrooms as pronunciation teaching practices instead of regular class practices. The impact of audiobooks on university-level students was investigated on both sound recognition and pronunciation level by Saka (2015). It was proven that audiobooks have been an effective tool for pre-intermediate level students. As most of the students indicated that they want to have a native-like speaking ability, audiobooks can be selected to pay attention to the learners' interest because it is more likely that listening to an audiobook takes a longer time than other language learning-oriented activities. Learners can listen to audiobooks of their interests and pace out of the classroom through computers, smartphones, or similar devices. Assigned audiobooks can be presented in five minutes presentations or group discussions can be supported. The teachers can initiate some question-answer sessions or direct learners to present alternative endings for the chapters.

Even though pronunciation software programs are assets for teaching pronunciation, most software programs cannot give feedback to learners for their production or do not give accurate feedback. The users need to notice the difference between the model utterance and their production. It is also the weakest aspect of the Quizlet tool which does not give any corrections and recording advice. Until the instructional technology improves fully, the teacher can create a response time for errors. Errors can be noted on a checklist or any inexpensive pocket camcorders can be used for video recording to review.

Finally, in the last quarter-century, pronunciation teaching has been taught with the multi-model method in that sounds are implemented visually, auditorily, kinesthetically, and in a tactile manner. That is to say, the teachers show sensitivity to students' autonomy, personality, ego, and identity in a learner-centered environment (Celce-M. et al., 2010). Several researchers like Thompson, Taylor, and Gray (2001) alleged that the Multiple Intelligence technique can be implemented to teach pronunciation of the target language in accordance with learners' intelligence types. Whereas rubber bands, balls, balloons, and body language can be applied for bodily-kinesthetic intelligence learners, card games and wall charts aid the visual/spatial intelligence of the learners. In the current study, the learners were the least successful at word stress, which may indicate that the teachers should attach more importance to suprasegmental features of pronunciation by instructing with explicit teaching. A list of target words can be given with underlined stressed syllables and when the teacher utters the words, the learners can clap. Likewise, the teacher may start with listening discrimination activities such as "contextualized minimal pairs, intonation patterns for tag questions, identification exercises by using songs, comic strips, nursery rhymes, limericks, and poems. Audios, technological tools, and videos serve as valuable resources" (Celce-Murcia et al., Teaching English as a Second or Foreign Language, 2008: p. 148).

Pronunciation training could be presented to beginner level learners through Fraser's (2001) theory of conceptualizing in the classrooms. Phonemic awareness at young ages would help learners grasp the target

language. In the second stage, learners should be instructed to notice the difference between L1 and L2. In the third stage of CT, cognates can be utilized to show the difference between target and native language pronunciation. To teach the right sound variations, role plays and dialogues can be implemented. This way, the teacher would address the suprasegmental features of pronunciation. To make learners internalize phonemes and other lexical phonemes authenticity in teaching affects the conscious level of learners.

FOR FURTHER RESEARCH
Expanding the duration of the treatment may assist in acquiring the segmental features of pronunciation. In the shed of this, future studies can consider long target language exposure time on the recognition and production of the segmental and suprasegmental features of pronunciation to see how online applications with audios may be important elements in vocabulary development. According to the findings of the study, segmental and suprasegmental aspects of the pronunciation presented in the study revealed the errors committed by the EFL high-school learners. The reasons behind these errors can be tracked and teacher interviews conducted to provide more reasonable results. It would be noteworthy if a future study could administer the Quizlet app at the same level as the EFL environment to see the effect of audio on their pronunciation and detect common errors.
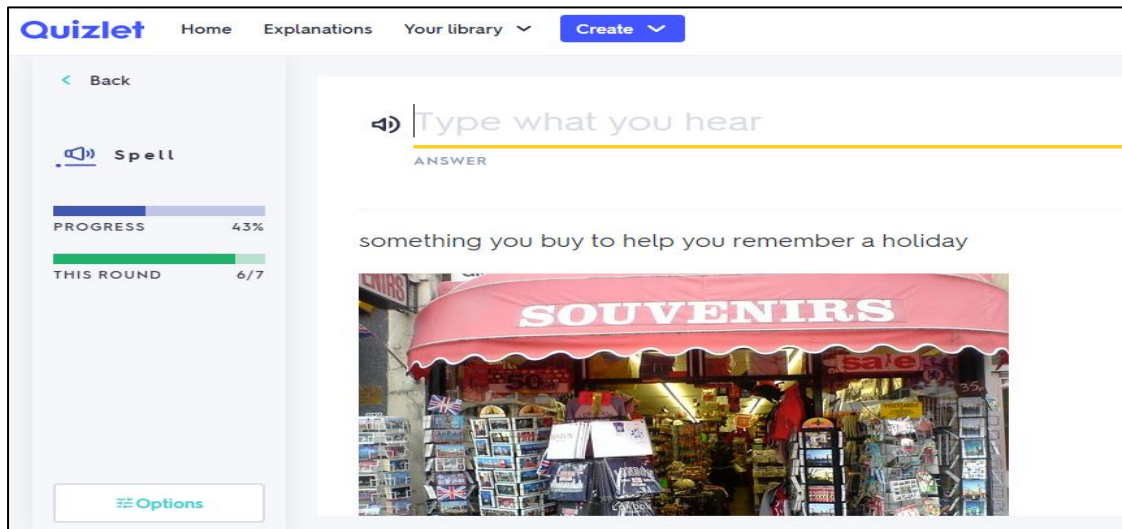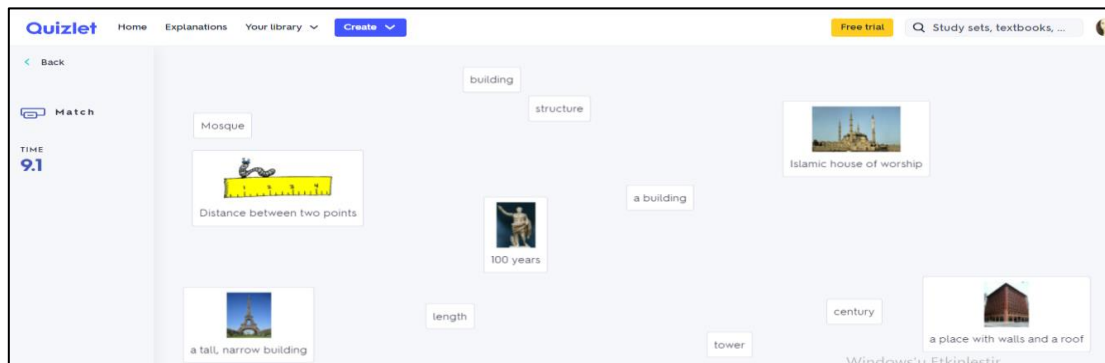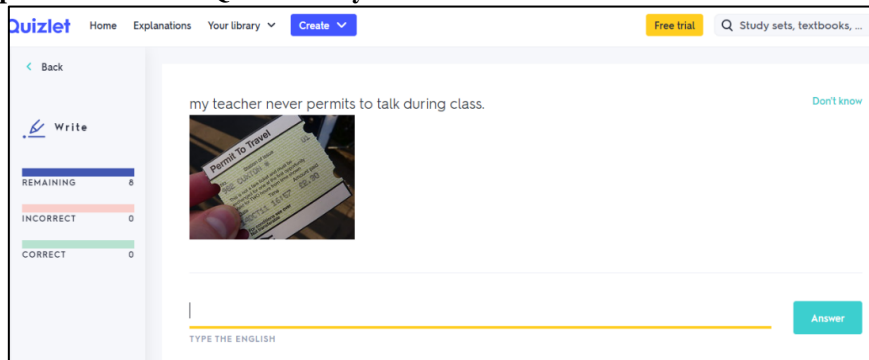
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APPENDICES

A- Example Screenshots of Quizlet Study Modes

B-An Example Screenshot of Pronunciation Scoring

STUDENT E1	ancient			height			heritage			masterpiece			structure			statue			length			mosque			historic		
SENTENCES	vowel qual	Consonant q	word stress	vowel quality	Consonant q	word stress	vowel quali	Consonant	word stress	vowel quality	Consonant	word stress	vowel quali	Consonant	word stress	vowel quali	Consonant	word stress	vowel quali	Consonant	word stress	vowel quali	Consonant	word stress	vowel quali	Consonant	word stress
I love ancient sites of Turkey																											
It is almost 2 feet in height.																											
The Taj is a UNESCO World heritage site.																											
His book is a masterpiece.																											
Skyscrapers are beautiful structures.																											
The statue of Liberty is located in New York																											
She has shoulder length hair.																											
They went to the mosque to pray.																											
She tries to give up sweetened soft drinks																											
They sent out the invitations yesterday.																											
I organized a farewell party for her.																											
Jane lit a candle.																											
Half of the students have a computer with internet access																											
You should log in to your account to get e-mail alerts.																											
His prediction turns out to be correct.																											
He made a television documentary on nature.																											
You can check-in online to save time.																											
If you disagree with him, get a second opinion																											

1-3=poor   4-6=satisfactory   7-8=Good   9-10=Excellent

The Learning Behaviour of Students Using E-Learning Under COVID-19 Condition

Hon Keung YAU
City University of Hong Kong. Department of Systems Engineering. Kowloon Tong, Kowloon, Hong Kong
honkyau@cityu.edu.hk

Jia Hui Chao
City University of Hong Kong. Department of Systems Engineering. Kowloon Tong, Kowloon, Hong Kong
huichajia2-c@my.cityu.edu.hk

ABSTRACT
The present study assesses the efficacy of online education in the context of the COVID-19 outbreak, scrutinizes its merits and demerits, pinpoints encountered challenges, and presents targeted solutions. We used the survey in this study. Totally 312 questionnaires were collected. The findings indicate that learners expect online instruction to entail greater interactivity, socialization, personalization, and enhanced technology usability. Although online education provides certain advantages, such as flexibility and cost-effectiveness, it also engenders certain drawbacks such as inadequate opportunities for face-to-face interaction and feedback, high technical requirements, susceptibility to cheating, and insufficient monitoring and feedback. Future investigations could expand the sample size and generalize the findings to real-world contexts.

INTRODUCTION
The present survey endeavors to conduct a comprehensive inquiry into the current landscape and determinants of virtual teaching for students enrolled in college during the recent pandemic outbreak. A holistic evaluation of the impact of such circumstances on e-learning shall be executed through scrutinizing the online learning experiences of college students, which shall ultimately enable us to provide practical and evidence-based recommendations and solutions to further enhance the quality of online education. This study aspires to identify and examine the variables that are closely associated with online learning outcomes, thereby enabling us to furnish educators and policymakers with sturdy and effective pedagogical guidelines and strategies. The principal objectives of this research encompass exploring the attitudes and perspectives of college students regarding online education, analyzing the various pros and cons of online learning for college students, investigating the challenges and roadblocks faced by college students in their online educational pursuits, scrutinizing the factors influencing the learning outcomes of college students undertaking online courses, and relaying tailor-made proposals and measures to bolster the efficacy of online teaching. The research will encompass, though not be confined to, current and graduating scholars as research subjects, universities across the nation as research settings, and the in-depth study of virtual teaching of college students during the pandemic as the core research theme.

THE STUDY
During the period of COVID-19 prevention and control, universities implemented extensive online teaching in order to ensure the quality and progress of education, in response to the initiative of the Ministry of Education. Presently, research on online learning among college students is exhibiting a growing trend year after year. Researchers focus on various areas including the advantages and disadvantages of online learning, factors impacting the effectiveness of online learning, and the future direction of online learning. In particular, one area of research explores the opportunities and challenges that online learning presents for college students. The characteristics of online learning for college students have become the impetus for reform in teaching models during the information age (Haleem et al., 2022). Wut and Xu (2021) advocate for college students to embrace both virtual and real-world online learning, along with providing relevant institutional support and emphasizing classroom interaction. A study examining online learning data from 200 students in a private higher education institution in the Philippines discovered that the primary challenge of online learning is the lack of a conducive learning atmosphere and reduced interaction between teachers and students, resulting in decreased learning efficiency (Barrot et al., 2021). The challenges of online education stem from limited learning experiences due to changes in teaching interaction patterns and inaccurate teaching evaluations caused by the detachment of teacher-student relationships (TURAN et al., 2022). In a survey on online English education conducted in Wuhan, China, Zou et al. found that inadequate self-discipline is strongly associated with poor performance in online courses (Zou et al., 2021). Apart from exploring the opportunities and challenges of online learning, empirical research on college students' online learning experiences remains significant. Hergüner et al. assert that the new digital divide is a critical factor impacting online learning, and adjusting attitudes towards online learning and proactive preparation are crucial in reducing and eliminating this divide (Hergüner et al., 2021). According to the findings

of Moffat et al., the adoption of role switching scripts can promote deep learning among college students during online asynchronous discussions (Moffat et al., 2021). In a study conducted by DiPasquale and Hunter, they compared the influence of in-depth teaching interactions and superficial teaching interactions on deep online learning and determined that the former holds greater significance (DiPasquale & Hunter, 2022). Additionally, some scholars propose that gamified teaching evaluations hold potential to enhance online learning performance (Nieto-Escamez & Roldán-Tapia, 2021). The research results of Díaz-Noguera et al. revealed that factors influencing college students' online learning include teachers' instructional methods, students' autonomy in learning, the platforms used, and technical facilities (Díaz-Noguera et al., 2022). In a two-year study on online learning experiences and influencing factors among students at Near East University in Cyprus, Senol et al. discovered that while most college students recognize the advantages of online education, the instability of network environments and technical issues exert the strongest impact (Senol et al., 2021). Other studies emphasize the significance of social presence as a key determinant of online learning quality, and stress the importance of designing "student-centered" courses while considering individual differences (student voices) in the learning process.

On the basis of previous studies, this research tries to find out the influence of related factors on college students' e-learning from the perspective of internal (age, gender)and external(learning stage) factors.

DEVELOPMENT OF HYPOTHESIS

This investigation presents an analytical framework concerning e-learning among college students, which is grounded in behavioral science theory. The study aims to investigate the effect of online learning behavior on both learning quality and progress. The research finds that teacher-student interaction is an essential element in improving learning outcomes, as evidenced by Gopal et al.'s (2021) findings. Based on literature and practical experience, this paper proposes the following research hypotheses:

Hypothesis 1: There are differences in the views of men and women on online transactions.
Hypothesis 2: Different age groups of students have different views on online.
Hypothesis 3: There are differences in the views of different student types on online education.

A. Variables

1. Dependent variable

The dependent variable used in this study is students' identification with online education, which is divided into identification with the advantages of online education and identification with the shortcomings of online education. For each question, we provide 5 levels: 1 Strongly disagree, 2 disagree, 3 neutral, 4 agree, and 5 Strongly agree. This study conducts a statistical analysis of students' views on online education.

2. Key explanatory variables

In this study, the influencing factors of college students' online education are the key explanatory variables. The variables are mainly internal factors and external factors of atmosphere. Among them, the study attributes the interactivity and adaptability of online courses to internal influencing factors, while Internet speed and whether online education is interfered by physical environment are considered as external factors.

3. Control variables

The control variables in this paper are mainly demographic characteristic variables, including gender, age, major, Internet access tools, online learning duration, school type, etc. Among them, the majors include liberal arts and science. Internet access includes online learning devices such as mobile phones, tablets and laptops. Online learning time refers to the number of hours of online learning per day.

FINDINGS

We have conducted a preliminary analysis of the survey population and found that the scope of our research covers all young student populations, providing some assurance for the reliability of the survey results. Through our detailed analysis above, we have also gained a general understanding of the conclusions of this survey. In the future, we will conduct a detailed analysis of this survey through more detailed indicators, and ultimately come to a reliable conclusion.

A. Population and Sample

A total of 312 questionnaires were collected in this survey. Among them, 308 were filled in through wechat links, accounting for 98.72 percent, while the other two came from web links and two from mobile phone submissions. As for the Background data of respondents are shown below.

Gender
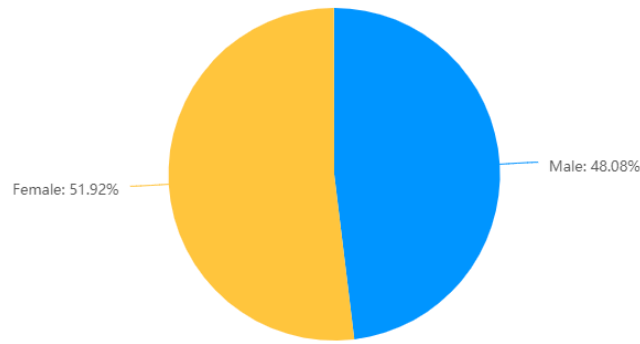
Figure1. Pie Chart of Respondents' Gender

From the above figure, it can be seen that the proportion of men and women in the surveyed population is relatively flat, which also indicates that this survey has a good gender balance.

Age
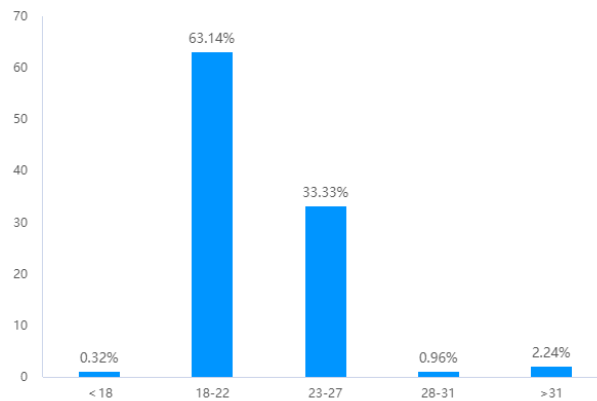
Figure2. Bar Chart of Respondents' Age

From the histogram above, we can see that the surveyed population is mainly concentrated in their twenties, which is due to the fact that our research mainly focuses on the student population in school. This proportion is beneficial for the survey results to more accurately reflect the relevant situation of students in school.

Learning stage
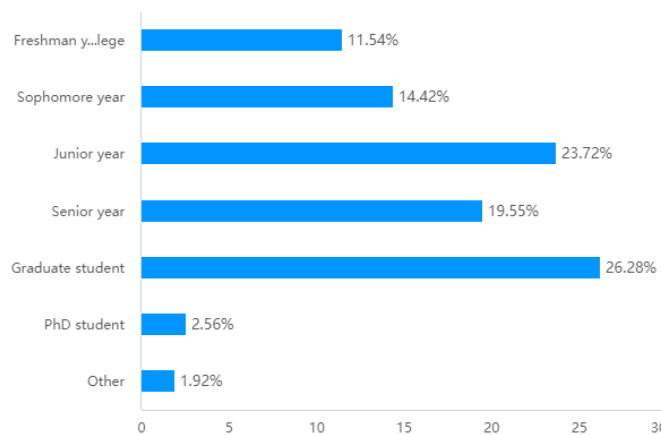
Figure3. Pie Chart of Respondents' Learning stage

From the horizontal graph above, we can see that this experiment covers almost all academic stages. Through this survey, we can make a more universal evaluation of the overall students.

Learning Mode
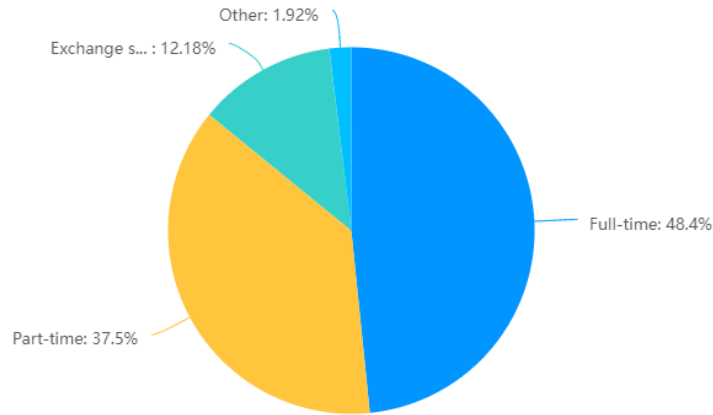
Figure4. Pie Chart of Respondents' Learning mode

From the pie chart above, we can see that the survey covers full-time and part-time students, and we can also have good general adaptability in this regard.

HYPOTHESIS TESTING

The study is to observe learning behaviour of students using e-learning under COVID-19 condition. By analyzing the collected data from the questionnaires, different results were found based on the research model and tested by the Statistical Package for Social Sciences software (SPSS). The analysis methods included Independent Sample T-test and One-way ANOVA.

A. Independent Samples T-test

Table1. Independent Samples T-test

No.	Gender(M±SD)		t	p
	Male(n=150)	Female (n=162)		
21	3.913±1.123	3.938±1.107	-0.197	0.844
22	3.820±1.141	3.858±1.147	-0.293	0.77
23	4.007±1.114	3.938±1.224	0.515	0.607
24	4.060±1.094	3.951±1.168	0.852	0.395
25	3.833±1.212	3.765±1.156	0.507	0.613
26	3.953±1.119	3.975±1.075	-0.177	0.86
27	4.087±1.141	3.988±1.120	0.773	0.44
28	3.713±1.183	3.821±1.097	-0.834	0.405
29	3.927±1.153	3.870±1.126	0.436	0.663

	Mean±SD	Mean±SD	t	Sig.
20	3.620±1.213	3.500±1.257	0.857	0.392
21	3.893±1.112	3.895±1.112	-0.014	0.989
22	3.480±1.325	3.488±1.296	-0.052	0.959
23	3.407±1.316	3.457±1.291	-0.339	0.734
24	3.620±1.174	3.840±1.086	-1.716	0.087
25	3.740±1.155	3.889±1.092	-1.17	0.243
31	2.740±1.318	2.778±1.370	-0.248	0.804
32	2.687±1.216	2.630±1.304	0.399	0.69
33	2.653±1.361	2.586±1.284	0.447	0.655
34	2.780±1.399	2.840±1.378	-0.378	0.706
35	2.427±1.239	2.463±1.175	-0.266	0.791
36	2.447±1.207	2.426±1.168	0.154	0.878
37	2.793±1.333	2.580±1.294	1.433	0.153
38	2.500±1.230	2.593±1.278	-0.651	0.516
39	2.667±1.283	2.716±1.340	-0.332	0.74
310	2.507±1.203	2.562±1.256	-0.395	0.693
41	2.660±1.284	2.759±1.323	-0.672	0.502
42	2.427±1.271	2.321±1.101	0.782	0.435
43	2.347±1.215	2.253±1.160	0.696	0.487
44	2.293±1.251	2.253±1.155	0.296	0.768
45	2.687±1.301	2.685±1.278	0.01	0.992

From the above table, it can be seen that the significance values of the Levene test are almost all greater than 0.05. This means that we can assume that there are differences between men and women regarding the same issue, so we used the values in the "Equal variances not assumed " row. Therefore, the significance value under the "mean equality t-test" is greater than 0.05. Therefore, based on past experience, this indicates that there is a gender difference in the perception of online education.

The digital disparity between genders has been extensively studied in academic circles, wherein investigations have indicated variances in device availability, information acquisition, and effectiveness of use between males and females. Although the divide in opportunities for internet usage has reduced, discrepancies remain in the frequency, comfort, and proficiency of computer usage. Research demonstrates that males exhibit higher levels of comfort and intensity in internet usage compared to females, and they also harbor more positive attitudes towards computers. Furthermore, gender influences the purpose and approach to computer usage, with women displaying a preference for communication and learning, while men tend to favor entertainment and online gaming.

Based on the above results, the hypothesis H1: there are differences in students' perceptions of online education among different gender groups.

Based on the above results, the hypothesis H2: there are differences in students' perceptions of online education among different age groups.

Based on the above results, the hypothesis H3: there are differences in students' perceptions of online education among student types.

B. One-way ANOVA
ANOVA tests for mean differences between independent groups, with post-hoc tests used to identify which groups differ significantly. Results are presented in a multiple comparisons table. A significance level of 0.05 or less indicates significant differences.

Table2. One-way ANOVA

No.	Gender(M±SD)		F□	p□
	Male (n=150)	Female (n=162)		
21	3.913±1.123	3.938±1.107	0.039	0.844
22	3.820±1.141	3.858±1.147	0.086	0.77
23	4.007±1.114	3.938±1.224	0.265	0.607
24	4.060±1.094	3.951±1.168	0.726	0.395
25	3.833±1.212	3.765±1.156	0.257	0.613
26	3.953±1.119	3.975±1.075	0.031	0.86
27	4.087±1.141	3.988±1.120	0.598	0.44
28	3.713±1.183	3.821±1.097	0.695	0.405
29	3.927±1.153	3.870±1.126	0.19	0.663
210	3.620±1.213	3.500±1.257	0.734	0.392
211	3.893±1.112	3.895±1.112	0	0.989
212	3.480±1.325	3.488±1.296	0.003	0.959
213	3.407±1.316	3.457±1.291	0.115	0.734
214	3.620±1.174	3.840±1.086	2.944	0.087
215	3.740±1.155	3.889±1.092	1.369	0.243
31	2.740±1.318	2.778±1.370	0.061	0.804
32	2.687±1.216	2.630±1.304	0.159	0.69
33	2.653±1.361	2.586±1.284	0.2	0.655
34	2.780±1.399	2.840±1.378	0.143	0.706
35	2.427±1.239	2.463±1.175	0.071	0.791
36	2.447±1.207	2.426±1.168	0.024	0.878
37	2.793±1.333	2.580±1.294	2.053	0.153

38	2.500±1.230	2.593±1.278	0.424	0.516
39	2.667±1.283	2.716±1.340	0.11	0.74
310	2.507±1.203	2.562±1.256	0.156	0.693
41	2.660±1.284	2.759±1.323	0.451	0.502
42	2.427±1.271	2.321±1.101	0.618	0.432
43	2.347±1.215	2.253±1.160	0.484	0.487
44	2.293±1.251	2.253±1.155	0.087	0.768
45	2.687±1.301	2.685±1.278	0	0.992

1. Comparison of Students' results between Ages

Table 2 showed that the significance level under ANOVA was 0.001 (F=1.297, $p < 0.05$). This indicated that the age groups had significant difference in perceived ease of use of online education. Hence, Post-hoc tests confirmed significant variation. The hypothesis H2,Older students have lower Perceived Ease of Use on online education than younger students, is supported.

2. Comparison of Students' answers between gender

Table 2 showed that the significance level under ANOVA was 0.007 (F=1.662, $p < 0.05$). This indicated that the age groups had significant difference in perceived ease of use of online education. Hence, from the table , Post-hoc tests confirmed significant variation. H1 hypothesis supported.

DISCUSSION AND CONCLUSION

In conclusion, this study has conducted a thorough analysis of the pros and cons of online education, considering different factors like gender, age, and academic background. The findings indicate that online education can be beneficial for learners who are self-motivated and independent, but it may not be suitable for everyone. To enhance the learning experience, the study recommends several measures, including the provision of more interactive and social features, personalized learning paths, and practical opportunities. However, it is important to note that this study has limitations, such as a small sample size and restricted data set. Future research should broaden the scope of analysis, increase the sample size, explore alternative methods for data analysis, incorporate machine learning techniques, and apply the findings to real-life situations.

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The Role of the Big Five Personality in Attitudes to Online Learning

Ahmet DÖNMEZ
Postdoctoral Researcher, Gaziantep/Turkey
ahmet27donmez27@gmail.com
ORCID: 0000-0001-6754-4369

M. Sibel YAMAN
Istanbul Rumeli University, Faculty of Sports Sciences, İstanbul/Turkey
msibelyaman@gmail.com
ORCID: 0000-0002-0715-3646

Çetin YAMAN
Marmara University, Faculty of Sports Sciences, İstanbul/Turkey
cetin.yaman@marmara.edu.tr
ORCID: 0000-0002-0888-2154

Gülten HERGÜNER
Sakarya University of Applied Sciences, Faculty of Sports Sciences, Sakarya/Turkey
herguner@subu.edu.tr
ORCID: 0000-0002-3087-3684

ABSTRACT
In this study, it is aimed to reveal the role of the Big Five personalities in online learning attitude. In the research carried out with the relational screening model, 89 females (age=20.61±2.37) and 124 males (age=20.80±2.69) aged between 18 and 33, a total of 213 (age=20.71±2.57) sports science students studying in sports sciences faculties of three different state universities in Turkey participated. The data were collected using "Personal Information Form", "Online Learning Attitude Scale" and "Big Five-50 Personality Test". Pearson correlation and regression analyses were are in the statistical evaluation of the data. According to the research findings, there were positive and low level significant relationships between online learning attitude scores and extraversion, conscientiousness, and openness to experience scores. In addition, openness to experience was found to have a significant predictive power on online learning attitude. As a result; the role of the Big Five personalities in online learning attitude has been revealed in the current research.
Keywords: Online learning, online learning attitude, personality, big five personality, sport sciences, student.

INTRODUCTION

The century we live in is a period of change and development in which learning emerges in different ways and enables new learning experiences. Such that, apart from classical face-to-face education, online learning, which has been used preferably or compulsory in educational environments in recent years, is one of these changes and developments. Online learning, which brings a new breath to the way of learning by transferring the classical classroom environment to the online environment, has undoubtedly become a platform that the learner will benefit from as an exciting learning method for those who are looking for an alternative solution in the classroom environment.

Online learning, which is essentially the use of technology to disseminate knowledge (Tajik and Vahedi, 2021), is expressed as learning experiences in synchronous or asynchronous environments using mobile phones, laptops, internet access, which makes the teaching-learning process innovative and student-centered (Dhawan, 2020). Online learning is a learning paradigm where training data points come in sequential order. When new data comes in, the existing model is quickly updated to produce the best model available so far. Therefore, the purpose of this learning is the same as the classical learning style, but to optimize the performance in the new learning task (Chen and Liu, 2018). When considered in terms of time and space, online learning (Wu, Xu, Xue, and Hu, 2023) that includes flexibility as well as convenience, has advantages such as low costs such as no need to go to school and only sufficient internet connection (Wu, Lin, Ou, Liu, Wang, and Chao, 2020). In addition to providing credits in higher education institutions, online learning environments have been offered as part of the course curriculum in recent years (Cohen and Baruth, 2017). Moreover, while the number of students who do not take online courses is increasing, online learning has become a trend (Allen, Seaman, Poulin, and Straut, 2016).

Online learning (Vandenhouten, Lepak, Reilly, and Berg, 2014), which is versatile, requires an online attitude (Usta, Uysal, and Okur, 2016). The learner's attitude towards learning is directly related to learning (Kara, 2010). That is, while positive attitudes of the individual in the learning process increase success, negative attitudes can cause failure (Kazazoğlu, 2013). When attitudes are developed positively towards learning, it will positively affect students' openness to learning and their behavioral tendencies accordingly (Çetin and Çetin, 2019). Hergüner, Son, Hergüner-Son, and Dönmez (2020, p. 103) who stated that it is necessary to have a positive attitude towards online learning, defined online learning attitude as *"the desire and the manner of the individual towards online learning".* It may not be correct to look at online learning only from a technological point of view and examine it from this perspective. Because examining and perceiving this learning method only in terms of technology may make the method unsuccessful (İşman, 2008). Considering this framework, the factors that can be effective in online learning should be examined (Biçer and Korucu, 2019). One of these factors is personality. Personality, which is closely related to learning (Eysenck, 1978), can provide information about the methodical approach of the person in terms of basic characteristics and the way of processing information, which is accepted as a measurement tool in terms of the learning process (Messick, 1984).

The origin of the word personality (Li, Li, Hao, Guan, and Zhu, 2014; Özer and Benet-Martinez, 2006), which is one of the most important topics in psychology research, goes back to persona, which means mask in Latin (Chamorro-Premuzic, 2014). In addition to being rich with various views and theories, there are many definitions for the concept of personality, which has a deep literature (Dönmez, 2022). If a few of these definitions are mentioned, personality can be defined as *"the underlying causes of individual behavior and experience within the person"* (Cloninger, 2013, p. 2). Personality is *"a distinctive, consistent and structured form of relationship that an individual establishes with his/her internal and external environment"* (Cüceloğlu, 2017, p. 404). Personality has been expressed as *"consistent behavioral patterns and intrapersonal processes arising from the individual himself"* (Burger, 2021, p.23). In the current research framework, personality will be discussed within the framework of the widely known and accepted "big five" (McCrae and Costa, 1985, 1987; Goldberg, 1990). The big five are extroversion, agreeableness, conscientiousness, emotional stability (neuroticism), and openness to experience (McCrae and Costa, 1985, 1987, 1989; McCrae and John, 1992; Goldberg, 1992). Those who are extroverts are expressed as warm, sociable, active, and thrill-seeking (McCrae and Costa, 1985); the mild-mannered are those who communicate, cooperate, be kind, and treat others kindly (Tai, Chen, Chang, and Hong, 2012); conscientiousness are task and goal-oriented, control impulses (Cervone and Pervin, 2016); those who are emotionally stable are calm, avoid excessive and maladaptive behaviors (Burger, 2021); those who are open to experience are those who are inclined towards art, adventure, and extraordinary ideas (Smith, Hamplova, Kelley, and Evans, 2021).

Unavoidable disasters and disaster situations (pandemic, earthquake, etc.) can also directly affect the educational environment. When these negative effects start to show themselves, it will be useful to apply to online education environments for a while in order to give a sigh of relief to the education environment. So much so that the uninterrupted continuation of education is an indispensable element for societies. Because a society that has fallen behind in education may be insufficient to raise future generations. Undoubtedly, due to the nature of learning, situations such as attitude, interest and relevance towards learning should not be forgotten. Moreover, it should not be forgotten that the influence of personality in directing and managing attitudes (Anderson, 1988), which is seen as an important predictor of human behavior, should not be ignored. As a matter of fact, it has been seen for a long time that the Big Five have been used as predictors of performance and preferences in educational settings, and most of the research has focused on traditional learning methods (Keller and Karau, 2013). For this reason, in the current study, it was deemed necessary to address the relationship of the Big Five with online learning attitude, which has been very popular in recent years. Personality traits of an individual can affect his/her desire, and attitude towards learning. Although there are studies on personality and online learning in different disciplines in the literature (Ravizza, Meram, and Hambrick, 2023; Cohen and Baruth, 2017; Keller and Karau, 2013; Lee and Lee, 2006; Butler and Pinto-Zipp, 2005; Schniederjans and Kim, 2005; Kim and Schniederjans, 2004; Downing and Chim, 2004; Kanuka and Nocente, 2003; Rovai, 2003), it is noteworthy that there are limited studies on sports science students who will undertake important tasks in the multidisciplinary field of sports sciences. Moreover, it was deemed necessary to conduct a research in the field of sports sciences, which is indispensable for educational environments and is one of the most popular branches of science. As a result of the literature information mentioned above and the need for current research, it is aimed to reveal the role of five big personalities in online learning attitude in this research.

METHOD
Research Model
Quantitative approaches were preferred in this study, in which the role of big five personalities in online learning attitude was determined. In terms of the purpose and scope of the research, *"relational screening model"* was

used in model selection. Karasar (2018, p. 114) expressed the model in question as *"research models aiming to determine the existence and/or degree of co-variation between two or more variables"*.

Research Group

The target audience of the research consists of sports science students studying at the Faculties of Sports Sciences of three different state universities in Turkey. The study group consisted of 89 females ($\overline{X}_{age}$=20,61±2,37),124 males ($\overline{X}_{age}$=20,80±2,69), aged between 18 and 33, selected by the "criterion sampling method", a total of 213 ($\overline{X}_{age}$=20,71±2,57) sports science students. In determining the criteria, the participant's criterion of taking online courses for at least one semester was taken into account. Descriptive statistics results for the sampling are given in Table 1.

Table 1. Descriptive statistics of the participants

Gender	n	%
Female	89	41,8
Male	124	58,2
University	**n**	**%**
A-University	74	34,7
B-University	72	33,8
C-University	67	31,5
Total	**213**	**100,0**

According to Table 1, 41.8% of the participants were female (n=89); 58.2% (n=124) of them were male. In addition, it was determined that 34.7% of the participants studied at A-University, 33.8% (n=72) at B-University, and 31.5% (n=67) at C-University.

Data Collection Tools

The data in the research were obtained by using the "Personal Information Form", "Online Learning Attitude Scale" and "Big Five-50 Personality Test". The details of the psychometric properties of the measurement tools are explained below.

Personal Information Form

The "Personal Information Form" was used to reach information such as gender, age, department and university of education about the participants participating in the research.

Online Learning Attitude Scale

"Online Learning Attitude Scale" developed by Usta, Uysal, and Okur (2016) was used to determine online learning attitude. The measurement tool consists of 20 items, 5-point Likert type, and there is no reverse scored item. In addition, it was revealed that the measurement tool had 4 factors ("general acceptance", "individual awareness", "usability" and "application effectiveness") during the development phase. The high scores obtained from the measurement tool indicate that they have a positive attitude towards online learning (Usta, Uysal and Okur, 2016). In the current study, the measurement tool was used over the total score, and the results of the scale are presented in Table 2.

Table 2. Results of the online learning attitude scale

	n	Number of Expressions	Skewness	Kurtosis	Croncbach α	$\overline{X} \pm SD$
Online Learning Attitude	213	20	-,260	,266	,903	65,67±15,17

As a result of the analysis in Table 2, the skewness and kurtosis values of the online learning scale changed between -1,.....,+1 (George and Mallery, 2019, pp. 114-115), and the Cronbach Alpha coefficient of the scale was ,903, and this result was According to Karagöz (2017, p.26), it can be said to be quite reliable. When the average score of the measurement tool is examined, it has been determined that the mean score is 65,67±15,17.

The Big Five-50 Personality Test

The Big Five-50 Personality test, which was adapted into Turkish by Tatar (2017), was used to determine personality traits in the study. The measurement tool consists of five factors, 50 items, 5-point Likert type and has a reverse scored item. The factors in question are "Extraversion, Agreeableness, Conscientiousness, Emotional Stability and Openness to Experience", respectively. The high scores obtained from the relevant

factors in the measurement tool indicated that the relevant personality trait was dominant (Tatar, 2017). The results of the measurement tool in the current study are presented in Table 3.

Table 3. Results of the Big Five-50 Personality Test

Factors	n	Number of Expression	Skewness	Kurtosis	Croncbach α	$\overline{X} \pm SD$
Extraversion	213	10	,202	,565	,706	3,11±,64
Agreeableness	213	10	-,015	-,156	,655	3,50±,61
Conscientiousness	213	10	,207	-,649	,713	3,70±,62
Emotional Stability	213	10	,129	,166	,751	2,98±,70
Openness to Experience	213	10	,047	-,188	,708	3,59±,60

Table 3 shows that the skewness and kurtosis values of the big five-50 personality tests vary between -1,…,+1 (George and Mallery, 2019, pp. 114-115), and the Cronbach Alpha coefficients of the measurement tool are between ,655 and ,751 it can be said that this result is quite reliable according to Karagöz (2017, p.26). Considering the mean scores of the factors, extraversion was 3,11±,64; agreeableness 3,50±,61; your conscientiousness is 3,70±,62; it was determined that emotional stability was 2,98±,70 and openness to experience was 3,59±,60.

Data Collection
Written permission was obtained from the Sakarya University of Applied Sciences Ethics Committee (E-26428519-044-65461) to collect data in the study. After the permission obtained, the data collection tools were transferred to the online environment (Google Forms) and the necessary written instructions were placed in the introduction part of the research form and the voluntary consent button was added to the beginning of the research. Data were collected from sports science students who read the written instructions about the research. During data collection, support was received from faculty members and lecturers working in departments at the relevant universities. The data were collected during the 2022-2023 academic fall semester in November.

Data Analysis
The data collected online were first checked and numerically coded. The coded data were transferred to the SPSS program, firstly, the reliability coefficients of the data were examined and it was determined that the measurement tools were at a reliable level within the scope of the current research. In order to decide on the statistical analyzes to be made, the skewness and kurtosis values of the data were examined and as a result of the statistical process, it was determined that the data were in the range of -1,..,+1 (George and Mallery, 2019, pp. 114-115), which are considered to be suitable for normal distribution. Pearson correlation and regression analyzes were used in the statistical evaluation of the data.

FINDINGS

Table 4. The results of the relationship between online learning attitude and five big personalities

		Extraversion	Agreeableness	Conscientiousness	Emotional Stability	Openness to Experience
Online Learning Attitude	r	,169	,101	,193	-,068	,244
	p	,014*	,141	,005**	,324	,000**

According to the results of the *"Pearson correlation"* analysis in Table 4, participants' online learning attitude scores and extraversion (r=.169; p=.014), conscientiousness (r=.193; p=.005) and openness to experience (r=.244; p=,000) positive low-level significant correlations were found between the scores.

Table 5. Prediction of online learning attitude by big five personality traits

Variable	B	Std. Error	β	t	p
Stabil	43,554	6,128	---	7,107	,000
Openness to Experience	6,154	1,682	,244	3,658	,000
R= ,24 R^2_{adj}=,06					

$F_{(1,211)} = 13,383$ p= ,000	
Dependent variable=Online Learning Attitude	Method: Stepwise

According to the multiple linear regression analysis in Table 5, it is seen that the regression model is statistically significant. When the t-test results regarding the significance of the regression coefficients were analyzed, it was found that openness to experience (β= .244; t=3.658; p=.000) had a significant predictive power on online learning attitude.

DISCUSSION, CONCLUSION AND SUGGESTIONS

In this study, it was aimed to reveal the role of big five personalities in online learning attitude. For this purpose, 213 sports science students studying in sports sciences faculties of three different state universities in Turkey and selected by criterion sampling method were included in the study.

Mankind has entered into an effort to learn and discover the developing and changing world. This effort has made it unique by keeping it separate from other living things (Turan, Yaman, Genç, Dönmez, Hergüner, and Yaman, 2022). The learning process is a process that is affected by different social, psychological, physical and environmental factors (Yılmaz, 2009). Undoubtedly, individual differences should not be ignored in this process (Tatar and Tatar, 2017). Individual differences in the learning process is a subject that has been studied in the literature for years (Güler, 2017). Moreover, research on these differences not only provides practical information to support the teaching process, but also allows a deeper understanding of emotional, cognitive and behavioral mechanisms (Seel, 2011). For this reason, the effects of personality on educational behavior in traditional educational settings have been discussed in detail in studies (Miller, 1991; Rauste-von Wright, 1986). On the other hand, in online learning environments, this situation is controversial (Fırat, 2022). So much so that the influence of personality in understanding and directing human behavior cannot be ignored. It is not possible to consider this effect independently of the educational environment. As a matter of fact, as a result of the disasters (epidemics, earthquakes, etc.) that have negatively affected human life in recent years, online learning environments have become an indispensable element of education and training, as well as a learning environment that can be used when needed in the short term as well as extraordinary situations.

Along with the development and change of online learning information and communication technologies on a global scale, it has been widely used with learning styles suitable for today's technological trend (Etlioğlu and Tekin, 2020). While the popularity of online learning environments is increasing day by day, many universities and colleges are working in-depth to make better use of the online platform for the learner (Dumford and Miller, 2018). Teaching process planning has an important role in online education as it is important at every stage of education. It is extremely important to plan online learning environments correctly, especially since they allow reaching participants that cannot be reached with traditional methods at once (Ilgaz, 2018). While making this planning, student attitudes, which are one of the important factors of academic success, should not be ignored (Dikmen, Tuncer and Şimşek, 2018). As a matter of fact, thanks to the attitude obtained as a learning product, the individual can experience a better learning process by improving himself (Hergüner, Yaman, Çağlak-Sarı, Yaman, and Dönmez, 2021; Kara, 2010). Whether learning is face-to-face or online, it is possible to say that a positive attitude towards learning will lead to more satisfaction with learning. So much so that the evidence in the literature supports this view (Ku, Tseng, and Akarasriworn, 2013; Piccoli, Ahmad, and Ives, 2001). In addition, the idea that student attitude in the learning process has a strong effect on behavior (Arbaugh, 2000) should not be ignored. Because behavior can be a guide in terms of preferences. Although many factors are effective on preference, the most important factor to manage these factors is personality. Moreover, personality traits are one of the most important elements to focus on in managing and directing behavior.

Knowing the personality traits of people, their thinking, feeling and behavioral tendencies has always been a popular and studied subject (Sánchez-Fernández, Ruiz, and Jiménez, 2023). In addition, the idea that personality is effective on learning is not a new claim (Bidjerano and Dai, 2007). So much so that when examining the characteristics underlying learning, it has been suggested that personality traits are responsible for processing information and that this is a factor that is consistent in this process, which is also examined as a learning feature (Messick, 1984). The research focused on five factor models that were agreed upon to examine personality in the literature (McCrae and Costa, 1987; McCrae and John, 1992; John and Srivastava, 1999).

As a result of the research, positive and low-level significant relationships were found between the participants' online learning attitude scores and their extraversion, conscientiousness and openness to experience scores. In addition, it has been revealed that openness to experience has a significant predictive power on online learning attitude. According to these results, it can be stated that with the increase of extraversion, conscientiousness and openness to experience, there is a positive attitude towards online learning. In addition, as a result of the

regression model, it was determined that while other personality traits were excluded from the model, the prediction of openness to experience in online learning attitude was 6%.

Extraversion includes warmth, being active and seeking excitement (McCrae and Costa, 1985), agreeableness being cooperative and sympathetic (Bruso, Stefaniak, and Bol, 2020); conscientiousness is goal-oriented working and controlling impulses (Cervone and Pervin, 2016); emotional stability is calm, avoiding excessive and maladaptive behaviors (Burger, 2021); openness to experience expresses intellectual curiosity and new experiences (John and Srivastava, 1999). Due to the results of the research and the nature of the personality traits in question, extroversion may also be willing to learn as a result of the necessity of being social whether it is face-to-face or online learning, conscientiousness may accept online learning as an educational tool as a result of the need for success and disciplined work, and openness to experience can be an educational tool. It has been shown that it can be thought that intellectual curiosity and new experiences can also be reached in the online learning environment. In addition, the fact that experience openness predicts online learning positively points out that the fact that online learning is an interesting learning environment should not be ignored. Evidence for this view has also been demonstrated in studies conducted in the literature (Lajunen, Gaygısız, and Wang, 2023).

Considering the studies conducted, Al-Dujaily, Kim, and Ryu (2013) reported that personality traits are indicative of learning styles and found that especially extrovert/introverted personality traits affect online learning. In another study, it was revealed that personality traits affect students' preferences in online learning environments (Tlili, Essalmi, Jemni and Chen, 2016). Ellis (2003) reported in his study that personality types show patterns in student attitudes. Fırat (2022) revealed in his research that extroversion, agreeableness, conscientiousness and openness to experience significantly predict e-learning in online learning environments in distance education students. Randler, Horzum, and Vollmer (2014) reported in their research on students that openness to experience is their willingness for distance education. In the results of his research on university students, Zhang (2003) revealed that conscientiousness and openness to experience are the best predictors of one's approach to learning. Other evidence in another study showed that conscientiousness is a personality trait that can benefit significantly in online courses, and openness to experience positively accepts online learning for career goals (Keller and Karau, 2013). In the studies conducted, it was emphasized that the students gave different reactions to the education methods depending on their personalities (İrani, Telg, Scherler, and Harrington, 2003). It is also included in research reports that personality is related to human-computer interaction and technology (Svendsen, Johnsen, Almås-Sørensen, and Vittersø, 2013).

Of course, there are some limitations in this research. More importantly, results are based on self-report. For this reason, revealing the role of personality on these behaviors by considering the variables that will affect student behavior such as participation rate in online learning, group assignments and course activities in future studies may support the current results. In addition, the findings of this study tried to reveal the personality in the attitude towards online learning. Revealing the role of personality while actively taking online courses in future research can support current research. Finally, the results obtained were not associated with learning outcomes. For this reason, revealing the possible effects of learning outcomes as a result of the online course will enrich the literature.

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Witnessing the Last Tropical Glaciers: Student Use of Virtual Reality Technology to Learn about Climate Change and Protecting Endangered Environments

Nina ADJANIN
Northwest Missouri State University
adanin@nwmissouri.edu
ORCID: 0000-0001-5393-6513

Gordon P BROOKS
Ohio University
brooksg@ohio.edu
ORCID: 0000-0002-2704-2505

ABSTRACT
Climate change and global warming have huge impacts on the most fragile ecosystems on Earth. With temperatures rising, most of the tropical glaciers on Earth, found near the Equator, will be gone before the end of the century. These far-removed natural areas are obscure and difficult for students to visit or learn from directly. Educating students in non-traditional, more experience-based settings is crucial for them to better understand current issues the world is facing, like glacial shrinkage, loss of sea ice, and accelerated sea level rise. This study found that virtual reality 360-degree video technology (VR-360), by providing close to real-life experiences and engaging storytelling, has the ability to engage students and provide them with meaningful information and experiences about climate change. In Phase 1 of this study, 65 students reported that VR can be beneficial for educational purposes to learn about global climate change. In Phase 2, with 227 students from around the globe, path analysis supported the need for VR-360 video producers to consider the importance of spatial presence, in the form of possible action and self-location, as critical elements of their videos to encourage people to use VR technology to learn about extreme environments and climate change.

INTRODUCTION
At a time when the world itself is facing a range of significant challenges—such as rises in air temperature and record heat waves, floods in some places, droughts in others leading to wildfires, ice shelves melting and collapsing in Antarctica and Greenland—a relatively new technology in education can help inform people of current issues that may not be close to them but, nevertheless, can have a significant impact on their future. The evolution of technology has brought tremendous change. Virtual Reality (VR), including 360-degree video, now has the cost-effective potential to bring far-distant environments to students because it can provide close to real-life experiences. VR has the potential to inspire students to reconnect with nature and to give them both a human perspective on climate change and a sense of respect for people fighting to preserve such fragile ecosystems.

Climate Change and Tropical Glaciers
Typically, climate change and global warming impact areas of the globe that are distant from population centers. These far-removed natural areas are obscure and difficult for students to visit or learn from directly. Educating students in non-traditional, more experience-based settings is therefore crucial for them to better understand current issues the world is facing, like glacial shrinkage, loss of sea ice, and accelerated sea level rise. This study investigated whether VR technology has the ability to engage students as well as provide them with meaningful information and experiences about climate change.

For this study, a VR-360 video educational experience of one of the last tropical glaciers in Colombia was created in order to investigate students' intention to use this modern technology. Do glaciers really exist in the tropics?! The word tropics is typically associated with sandy beaches, rainforests, and hot humid weather near the equator. Rarely are the tropics associated with snow, glaciers, or high mountains, but glaciers can be found in most of the highest mountains in the world—even in the tropics. Inherited from the last Ice Age, today about 3,000 glaciers are still holding onto their elevated summits between the Tropics of Cancer and Capricorn. These tropical glaciers, mostly found in Andes mountains of South America, but also in East Africa and the Pacific islands of Papua New Guinea (Kaser & Osmaston, 2002), are the last of their kind and are disappearing fast, directly impacted by increasing air temperatures and changing weather patterns.

Tropical glaciers archive important information about the climate, and at the same time, provide a water resource for humans, in addition to the local flora and fauna. Unfortunately, according to Enslin (2017), the glaciers in Peru

have deteriorated considerably. Over the last 50 years their surfaces have reduced by half, with increasing global air temperatures, El Niño effects, and volcanic eruptions all playing a role in their recession. Ceballos et al. (2006) reported that glacial retreat has also been taking place over recent decades in the highest mountains of Colombia. According to Rabatel et al. (2018), for example, the surface of the Colombian glacier Nevado Santa Isabel in Los Nevados National Park reduces by 3 percent per year. Colombian glaciers have gone from 374 km^2 at their peak to 37 km^2 in 2017; hence, Colombia has lost over 90% of its glacial area in the last 170 years (IDEAM, 2017). Scientists caution that within a few decades, all the world's tropical glaciers will vanish (Whitfield, 2001). This will impact many millions of people who rely almost entirely on water from glaciers for drinking, agriculture, irrigation, hydroelectricity generation, and other purposes.

Virtual Reality
VR is often loosely used synonymously with 360-video, augmented reality (AR), extended reality (XR), mixed reality (MR), and others. For our purposes, VR is defined as a three-dimensional space learning environment, where learners can be in a fully digital environment encompassed in the virtual world, such as a 360-video cave projection (Moore, 2019). VR refers to the technology conceptually, as well as the hardware required for the technology.

A key element to VR, that differentiates VR from other technologies, is the concept of spatial presence, which is a heuristic and perceptive experience that often emanates from VR (Wirth et al., 2007). Biocca (1997) described spatial presence as the idiosyncratic conscious impression of "being there," even when the actual user is situated in a different place and knows they are not "there." When immersion triggers this presence, which commonly happens in VR or 360-video, the user will behave within the virtual environment instead of the real setting (Slater & Wilbur, 1997; Slater, 2009). Slater and Sanchez-Vives (2016) wrote that the brain's perceptual system treats the virtual environment as if it were the participant's actual surroundings. For example, spatial presence related to VR in education about extreme environments would allow students to experience things like high mountain glaciers without the discomforts of exposure to extreme conditions like lack of oxygen, cold temperatures, and increased exposure to other risks (Linxweiler & Maude, 2017).

VR in Climate Education
The affordability and ubiquity of educational technology drastically revolutionizes the ways learners interact with educators and gain information about the world at an accelerating rate (Dunleavy et al., 2008; Huang et al., 2019). In the case of VR, Huang et al. (2019) showed that both AR and VR environments improve knowledge retention because of spatial presence, which resulted in both psychological and cognitive reactions. Winn (1993) reported that VR helps to create first person, non-symbolic experiences that better assist students to retain educational materials. Quieroz, Fauville, Abeles, Levett, and Bailenson (2023) have reported that as people used VR in museums, they perceived climate risks as more severe and were more motivated to engage in pro-environment activities. Similarly, Thoma, Hartmann, Christen, Mayer, Mast, and Weibel (2023) and Nelson, Anggraini, and Schluter (2020) found that VR experiences helped to increase environmental awareness and encourage pro-environment behavior.

Education does not occur only in the classroom. Many different projects and organizations around the globe have a mission to educate students and young people on the science of climate change to help empower them to take action. Identifying technologies that will help with both curricular and extracurricular education will be important for these efforts. The most endangered areas—for example, polar regions, high mountains, oceans—are at vast distances from most populated locations. Travel for firsthand learning opportunities is often too difficult or too expensive for schools to provide or for individuals to access. However, technology has the capacity to enhance the quality of academic courses on climate change when field classes are impossible. Therefore, for many students, the only way to see tropical mountain areas will be through technology and distance learning. As Atkins, Charles, and Adjanin (2020) suggested, "If we are not able to take students to see specific environment, we believe that education delivered through the use of 360VR can 'bring' these remote areas to the students."

Some have studied specifically the value of incorporating technology, such as VR, in climate education. For example, Gold et. al. (2015) reported that incorporating technology, like student-produced videos about climate change, improved learning among middle and high school students. Dailidienė et al. (2019) found that graduate students strongly agreed that environmental change management is only possible through the integration of a new technology in education—to understand current issues and advocate for the future. VR may present a solution to expose students to challenging learning environments that are inaccessible due to weather, difficult terrain, political issues, distance, or human mobility. For example, Yu et al. (2018) suggested that VR can be an option for individuals with limited mobility to approach remote regions that would previously be inaccessible to them to gain an environmental experience. Riva (2020) showed the possibility for VR technology to be used as an

environmental conservation tool, to help people visualize and conceptualize ocean acidification. Guttentag (2010) and Tussyadiah (2016) claimed that the tourism industry can benefit financially by helping people create memories in places to which they cannot typically travel. Cho and Park (2023) reported that because immersive VR gives students realistic experiences, it can help them become aware of and solve problems related to the environment.

Theoretical Framework

Davis (1986) introduced the Technology Acceptance Model (TAM) to evaluate technology—particularly users' intention to use various office and educational technology. TAM focuses on users' acceptance or rejection of innovative technology and can be used to explain how and why people decide to adopt different technologies (Davis, 1986; Davis & Venkatesh, 1996). Using TAM as a framework can help us learn how VR can be successfully deployed as an educational technology. Therefore, based on the suggestion from Chen et al. (2012), TAM is the model used for this VR study to examine the factors driving college students' use of VR to better understand climate change and its impact on tropical glaciers. It has also shown promise in studying the acceptance of technologies in outdoor and extreme environments (Nikou & Economides, 2016).

TAM implies that intention to use technology is considered the major predictor of actual usage behavior. In TAM, the user's attitude toward, acceptance of, and intention to use technology can be explained by two primary beliefs: perceived usefulness and perceived ease of use. Perceived usefulness (PU) is a subjective belief that represents "the degree to which a person believes that using a particular system would enhance his or her job" (Davis 1989, p. 320). PU addresses how strongly respondents believe that VR could enhance their performance, effectiveness, and productivity. Perceived ease of use (PEU) is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis 1989, p. 320). PEU is concerned with beliefs about users' control, freedom, and ease in using technology. The key factors of TAM for education are the beliefs that technology, like VR, will support students' learning and that using VR is easy for students and teachers (Davis, 1989; Davis et al., 1989). These beliefs then lead to a more positive attitude toward technology which leads to a stronger intention to use it.

According to Davis and Venkatesh (1996), it is important to emphasize external factors that will affect the intention to use each different type of technology. Because the literature has suggested that spatial presence is a critical construct for VR technology (Tichon, 2007), spatial presence has been incorporated into the model. Literature has suggested that spatial presence may predict both perceived usefulness and attitude toward use. Hence, the modified TAM model designed for this study (called VR-TAM) will contain two constructs added from Hartmann et al. (2016): possible action and self-location. Self-location refers to users' feeling of "being there" and possible action refers to users' "subjective impression that they would be able to carry out actions in the environment" (Hartmann et al., 2016, p. 5). That is, students using VR on tropical glaciers should have the impression that they are standing on the ice or walking through vegetation of the tropical mountain region. Therefore, the VR-TAM model adds these variables (identified in blue) to the core TAM variables (yellow) in Figure 1.
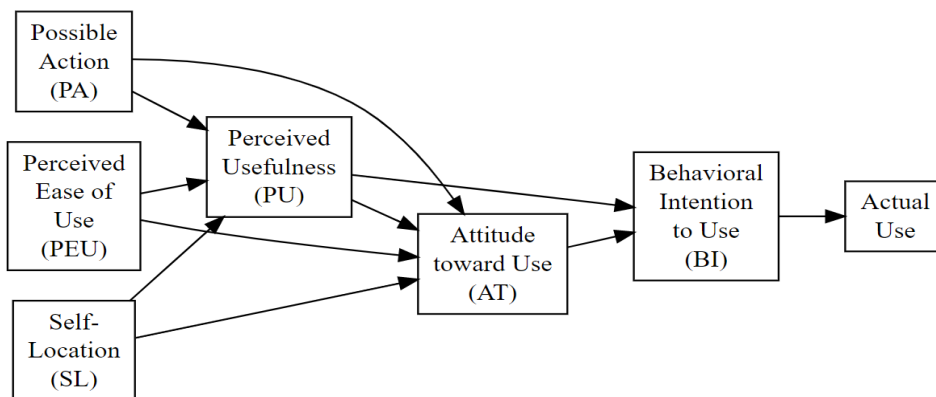

Figure 1. Initial VR-TAM Model

PURPOSE OF THE STUDY

Atkins, Charles, and Adjanin (2020) wrote that faculty must continue to explore the use of new technologies as ways to deliver instruction. The purpose of the study specifically addressed their charge to see where college students would embrace 360-degree VR to learn about climate change and tropical regions. Further, another purpose is to identify variables that may help determine whether young adults would use VR for lifelong learning about important environmental topics. Before climate agencies and non-profits begin to create such VR-360

videos, it will be useful to identify how likely young adults will be to use the technology to learn about climate change and extreme environments, as well as what are the important predictors of VR use.

The use of VR technology in climate education was studied using TAM as a framework to study the value of VR technology to climate education. Davis's (1986) TAM model has been shown to predict students' behavioral intention to accept and use VR in a college setting. In particular, predictors were identified that impact students' acceptance of VR as a learning device to better understand climate change in tropical mountain regions. Two research phases were used to answer the research questions for the study. Results from Phase 1 guided the execution of Phase 2. In Phase 2, students were exposed to an educational activity, about which students responded to an online survey.

PHASE 1: ELICITATION STUDY

The guiding research question for the Phase 1 Elicitation Study was: Do college students think the use of technology as VR will impact students' learning outcomes related to climate change and tropical glaciers? The goal was to determine the core salient beliefs students had about the use of VR to experience a previously unexplored natural environment for educational purposes. These beliefs were focused on normative referents and control factors regarding the use of VR technology in education.

After obtaining IRB approval, purposeful sampling was used through email and social media platforms to recruit students who were familiar with VR technology used in education. A total of 110 students were invited to participate in this phase and 62 provided useful information. The participants were all college students, 56.5% male and 43.5% female, from 9 different universities around the globe. The majority of students (79%) who participated in this phase were from a midwestern American university, with most of the remaining 21% from European universities. Ages ranged from 20-52 years old, with a mean age of 31 years. Over half, 59.7%, of students reported having previous experience with VR.

Participants were asked to provide demographic information and to answer questions about the use of VR technology. Data were collected using open-ended survey questions in Qualtrics that were adapted from previous elicitation studies (Ajzen, 2013; Ajzen & Fishbein, 1980). The questions were designed to understand the students' behavior and normative beliefs related to VR technology and to obtain their perceptions of what constitutes the strengths and weaknesses of utilizing VR in educational settings.

Phase 1 Results

The results from the Phase 1 Elicitation Study showed that a majority of the students surveyed in this phase would use VR if they had the opportunity to use it to learn about climate change and the impact of global warming. Among these students, 95.2% agreed completely that VR can be beneficial for educational purposes to learn about climate change. In particular, 38.7% of participants revealed that they intend to use VR for environmental education, 27.4% expressed the usefulness of VR as a device for virtual travel, and other participants indicated that they would use VR for fun, for gaming, and for new ways of exploring different subjects.

The participants suggested that VR can be a unique teaching tool to provide experiences for educational topics being studied at a great distance, such as touring a polar environment or a new kind of scientific field trip. Many students agreed that VR can be a unique way to engage a diverse community in learning, especially when the settings are located in a challenging physical or geographical context. Participants believed that by using VR they could acquire a more authentic experience exploring other cultures and environments globally, to which they may not be able to travel. VR can be used to show the progression of the life of a glacier over time to help students learn about the impact of climate change.

Students identified several advantages of using VR in an education setting. They recognized VR as a device to experience environmental issues and travel in a safe way. That is, because some travel may require specific technical skills or is overly risky, VR allows everyone access to a realistic, authentic experience without being exposed to dangers, such as high altitudes or freezing temperatures. Many of the participants also revealed that the use of VR in education, especially in learning about climate change, can change the students' perspective and help them develop empathy for the environment.

Students, however, also identified some disadvantages that VR might have, such as the high price, lack of availability of VR devices, and specific applications that are necessary for using VR. VR could possibly lead to lost human interaction and decreased communication with peers and in the classroom. Some of the students shared that they had experienced motion sickness or cybersickness while using VR. Concern regarding how to operate the devices was one of the main disadvantages that students expressed. Finally, a current lack of quality educational

content for VR devices may pose difficulties for using VR in education: "The content is important. If the VR does not provide real settings or meaningful content, I would not want to use it."

PHASE 2: FINAL STUDY
The findings of the Phase 1 Elicitation Study and recommendations from the literature helped guide the development of the instrument used in the second phase of the study. As suggested for using the TAM model (Davis, 1986), in addition to using TAM variables, the model was modified by adding external variables identified in the literature and obtained from the elicitation study. External variables were Self-Location (SL) and Possible Action (PA), measured by the Spatial Presence Experience Scale (SPES, Hartmann et al., 2016). In this study of VR, SL and PA are hypothesized to help explain PU and AT. The theoretical model studied was named VR-TAM (see Figure 1). The primary research question that guided the research in Phase 2 was: Does the VR-TAM predict an intention to use VR among college students for their future learning and understanding environmental subjects such as climate change in tropical regions? The question will be answered based on a path analysis of the VR-TAM model, testing the paths of the model and the overall amount of variation explained in Behavioral Intention to use (BI) technology for learning about climate change and tropical glaciers. In addition to SL and PA, the predictors in the VR-TAM model are: Perceived usefulness (PU), Perceived ease of use (PEU), and Attitude toward using VR (AT).

Participants
Participants in this Phase 2 study were both undergraduate and graduate students from 51 different universities and 35 different home countries around the globe, including Ohio University, University Centre in Svalbard, University of Alicante Spain, National University of Colombia, and others. Recruitment for the study occurred through social media platforms (e.g., LinkedIn, Facebook, and Viber) and also through faculty who were known to share an interest in new educational technologies. Faculty acquaintances at other universities received detailed guidelines on how to provide VR headsets to students, as well as directions on how to access the online platform Oculus/YouTube. In total, 25 Oculus Go VR headsets were sent to these faculty assistants for the study. Ultimately, 271 participants were recruited, and they provided 227 useful questionnaires (32 did not go beyond the consent form and 12 did not complete enough sections of the questionnaire).

The majority of participants were female (52%), with 41.4 % male and 5.7% self-identified as another gender. Graduate students (master's or doctoral) comprised 63% of the sample and undergraduate students represented 37%. About 74% of participants said they had some experience with VR (all others indicated this was their first VR experience). Most students used the Oculus headset (27.3%) or Smartphone-VR (52.4%) to participate in this study, while some students used computers to access the video. In regard to climate change, about 81% of students expressed an interest in learning about climate change. Not many students had previous knowledge about tropical glaciers: about 60% of students said they had no previous knowledge and 20.7% were not sure.

Educational Activity
A VR-360 experience was created that was set in one of the fastest-disappearing environments on Earth: the Santa Isabel Mountain, Nevados National Park in Colombia, home to one of the last tropical glaciers of South America and myriad endemic species. The narrative lecture in the video was provided by Dr. Heïdi Sevestre, the winner of the inaugural Shackleton Medal for the Protection of the Polar Regions, who is a glaciologist and pioneering climate activist. Dr. Sevestre tells the story of the last tropical glaciers in Colombia, while also educating the user to understand that glaciers in the tropical regions are rare and unique, as well as what can potentially be done to preserve them from extinction. The video was an 8-minute VR lecture that was a 360-degree projection of the glacier located at a height of 17,000 feet in Colombia. The 360-video was created with Premier Pro software with footage that was collected in the fall of 2019 in Colombia. A 360 One X camera and a Zoom H 4 audio recorder were used to assemble the video and audio material.

The "Last Tropical Glacier" video was provided through the Oculus and YouTube-VR online platforms. Every participant confirmed informed consent prior to watching the video and filling out the questionnaire. Participants watched the video using a VR headset. Some participants had access to Oculus Go VR headsets through faculty associates at the universities, however, most participants used their own devices (e.g., computer, smartphone, Smartphone Cardboard). Participants were monitored locally or through internet support from the researcher.

Instrumentation
After receiving IRB approval for Phase 2, data were collected using the Qualtrics online platform. The questionnaire comprised the following sections: basic demographics, VR ownership, VR experience, the four subscales of the TAM instrument, and the two subscales of the SPES. Subscale scores were created as mean item scores for each of the variables. The TAM instrument comprises 15 items that represent the four different

constructs, each measured on a 5-point Likert scale, from 1 (totally disagree) to 5 (totally agree). The TAM scales have been studied for validity and reliability many times and the subscales have typically provided reliability estimates above .90 (see Table 1 for current study reliability). Table 1 also contains descriptive information for the two spatial presence variables, SL and PA (Hartmann et al., 2016), which are both on the same scale as the TAM scales and were added to the VR-TAM model in order to explain spatial presence as predictors of VR technology use.

Table 1. Descriptive Statistics for VR-TAM Variables

	Mean	SD	Cronbach's alpha	Items
Behavioral Intention (BI)	4.56	0.66	.82	3
Attitude toward Use (AT)	4.33	0.68	.76	4
Perceived Ease of Use (PEU)	4.18	0.65	.84	4
Perceived Usefulness (PU)	4.69	0.52	.91	4
Possible Action (PA)	4.28	0.72	.85	4
Self-Location (SL)	4.28	0.74	.88	4

Phase 2 Results

The data acquired from the online questionnaire were exported from Qualtrics to IBM SPSS and R for analysis. The mean for BI was $M = 4.56$ ($SD = 0.66$). The means for PEU was $M = 4.18$ ($SD = 0.65$), for PU was $M = 4.69$ ($SD = 0.52$), for AT was $M = 4.33$ ($SD = 0.68$), for PA was $M = 4.28$ ($SD = 0.72$), and for SL was $M = 4.28$ ($SD = 0.74$). Correlations among variables are presented in Table 2.

Table 2. Correlations among VR-TAM Variables

	AT	PEU	PU	PA	SL[1]
Behavioral Intention (BI)	.57**	.43**	.64**	.42**	.47**
Attitude toward Use (AT)		.31**	.57**	.58**	.57**
Perceived Ease of Use (PEU)			.54**	.33**	.32**
Perceived Usefulness (PU)				.57**	.59**
Possible Action (PA)					.85**

** = $p < .001$
[1] SL is abbreviation for Self-Location

Because means were greater than 4 for all variables, there may be ceiling effects for the variables, perhaps due in part to social desirability or acquiescence response sets. The ceiling effect may impact normality and may reduce variability which in turn may impact statistical power and correlations between variables. To confirm there was no violation of the assumptions, variables were tested and examined. A small number of outliers were identified using Mahalanobis distance but were included in the analyses because they were legitimate scores and did not appear to impact the conclusions.

In order to observe the potentially mediated relationships among variables hypothesized by the VR-TAM, path analysis was used to analyze complex relationships among variables. The initial path model chi-square $\chi^2(4) = 9.121$, $p = .058$. The chi-square statistic was not statistically significant indicating that the model fit the data adequately. Other useful model fit statistics were also calculated: GFI = 0.982, CFI = .988, TLI = .963, and SRMR = .021. The RMSEA was .075, with a 90% confidence interval of [.000, .141] and, for the null hypothesis RMSEA <= 0.05, p = .210.

Despite the reasonable fit of the initial VR-TAM path model (see Figure 1), it contained two nonsignificant paths (SL predicting AT and PEU predicting AT). Both nonsignificant paths were consequently removed from the analysis. The final path model (see Figure 2) explained 47.3% of the variation in BI, 48.9% of the variation in PU, and 42.0% of the variation in AT. All three predictors of PU were statistically significant: SL ($\beta = 0.31$, p = .001), PA ($\beta = 0.18$, p = .046), and PEU ($\beta = 0.38$, p < .001). Both PA ($\beta = 0.38$, p < .001) and PU ($\beta = 0.35$, p < .001) were statistically significant predictors of AT. Finally, both PU ($\beta = 0.48$, p < .001) and AT ($\beta = 0.30$, p < .001) were statistically significant predictors of BI.

The final path model chi-square $\chi^2(4) = 9.123$, $p = .104$. The chi-square statistic was not statistically significant indicating that the model fit the data adequately. Other useful model fit statistics were also calculated: GFI = 0.990, CFI = .993, TLI = .976, and SRMR = .021. The RMSEA was .060, with a 90% confidence interval of [.000, .121] and, for the null hypothesis RMSEA <= 0.05, p = .328.
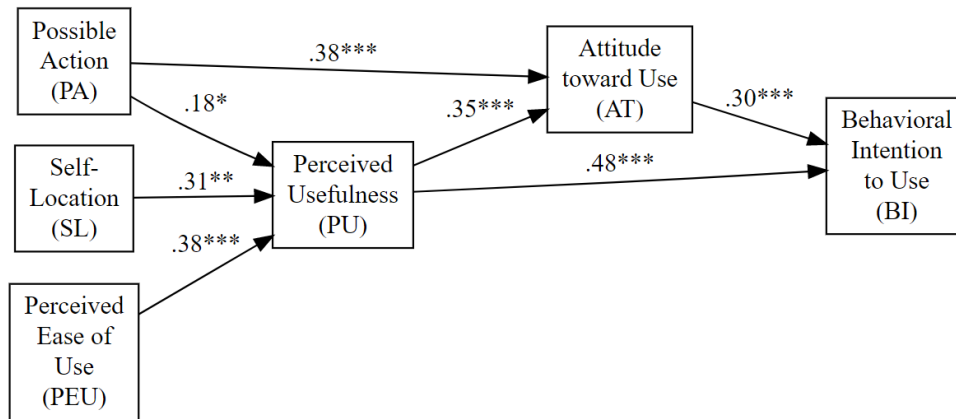
Figure 2. Final model Path Analysis results (*= p <.05; **p < .01; ***= p < .001)

VR Device Type

To use VR content, it is necessary to use VR hardware. That is, the hardware plays an essential role in the VR experience. Therefore, a supplemental analysis compared variables across the type of VR device used by students. One-way ANOVA was conducted to compare the pseudo-experimental differences in the type of technology device that was used for watching the 360-video. Smartphone and Smartphone Cardboard users were combined into a single group and both desktop and laptop computer users were combined into a single group, making three groups with the Oculus Go group included (see Table 3). The ANOVA across devices for all VR-TAM variables was statistically significant using the Welch ANOVA F test: BI yielded a Welch $F(2, 80.87) = 15.23$, $p < .001$; for PA, Welch $F(2, 73.49) = 45.25$, $p < .001$; for SL, Welch $F(2, 76.08) = 56.63$, $p < .001$; for PU, Welch $F(2, 75.49) = 17.27$, $p < .001$; for PEU, Welch $F(2, 76.85) = 7.48$, $p = .001$; and for PEU, Welch $F(2, 74.80) = 32.95$, $p < .001$. Post hoc comparisons were performed using the Games-Howell procedure with a Bonferroni-adjusted alpha of .0083 for testing hypotheses for the six dependent variables. For BI, PA, SL, PU, and AT, the Games-Howell multiple comparisons showed that Oculus differed from both other groups (i.e., Smartphones and Computers) at the adjusted alpha level of significance; however, Computers and Smartphones did not differ statistically significantly for any of those five variables. On the other hand, Oculus differed statistically significantly from only Smartphones for the variable PEU, with the other comparisons both nonsignificant.

Table 3. Means and Standard Deviations for different types of VR

	Computer (N = 31)		Oculus (N = 62)		Smartphone (N = 131)	
Variable	Mean	SD	Mean	SD	Mean	SD
Behavioral Intention (BI)	4.40	0.59	4.84	0.36	4.46	0.75
Possible Action (PA)	3.81	0.92	4.78	0.33	4.16	0.68
Self-Location (SL)	3.92	0.77	4.85	0.36	4.10	0.72
Perceived Usefulness (PU)	4.57	0.53	4.92	0.22	4.61	0.59
Perceived Ease of Use (PEU)	4.20	0.74	3.96	0.38	4.26	0.71
Attitude toward Use (AT)	4.15	0.78	4.74	0.31	4.19	0.70

CONCLUSIONS

In this study, virtual reality (VR) was investigated as an educational technology with the potential to be used in educational settings for learning about climate change and the impending disappearance of tropical glaciers. Juxtaposed between insufficient education resources and knowledge about climate change and tropical high mountain regions, VR education could serve as the fulcrum which balances the needs to learn, understand, and preserve natural sources that are losing the battle against global warming.

The TAM model was expanded to work with virtual reality by adding spatial presence ("being there") as explanatory variables for perceived usefulness. In the Phase 2 path analysis, both self-location and possible action, along with perceived ease of use, were found to be statistically significant predictors of perceived usefulness, which was the strongest predictor of behavioral intention to use VR. Possible action was also predictive of attitude, however, interestingly, self-location was not statistically significant predictor of attitude. These results suggest the

importance of the VR video experience itself in terms of spatial presence, which points to the need to pay careful attention to the design of the virtual environment and the storytelling used for educational purposes.

The one-way ANOVA showed that Oculus Go VR equipment provided the highest spatial presence, perceived usefulness, attitude, intention to use VR, but it was considered the most difficult to use. Conversely, while smartphones and computers may be easier to use, they do not yet match Oculus headwear for the critical spatial presence aspect of VR. Because possible action was a significant predictor of attitude, this may mean that paying attention to the available equipment may matter for creating educational content for VR.

Unexpectedly, based on the TAM literature, perceived ease of use did not explain variation in attitude toward VR use in the presence of the possible action predictor. This result could be due to the difficulty some participants had in using the VR hardware. Similar results have been found in the literature for VR technology. For example, Markowitz, Laha, Perone, Pea, and Bailenson (2018) reported that parts of the VR learning experience may be difficult for the user to manipulate.

VR in Climate Change Education
When considering VR technology from an educational standpoint, the concern is that students have experiences that reach similar outcomes as if they would have if they had gone on a field trip. Among other advantages and disadvantages suggested by students reported above, they indicated that the cost of owning a high-quality VR device (like Oculus Go) and instructions for use were two of the main concerns about implementation of VR for education. The VR-TAM model was strong for all devices, but further study could show that because the devices matter for spatial presence, prices may need to drop further before VR can truly become integral to education. These disadvantages fit with concerns like installation of the VR applications and cyber-sickness mentioned by others (e.g., Dirin, 2020).

VR technology has the ability to change education about climate change in a positive way. Getting young adults to gain experience in distant environments that are not easily accessible is essential so that educators can influence them in the right direction to act, conserve, and love our environment. Utilizing VR in education can create immersive and interactive learning experiences accessible to all. VR has the potential to revolutionize the way people teach, learn, and bridge the knowledge-action gap on climate change. Technology has sometimes been a destructive force in the world, but at the same time it can be a powerful force in solving and educating about the current existential crises that humanity is facing.

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