

# Turkish Online Journal of Educational Technology

*Volume 20, Issue 1*

*Januray 2021*

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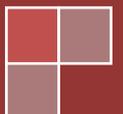
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**ISSN: 2146 - 7242**

**Indexed by**

Education Research Index  
ERIC  
EBSCO Online  
Cabell's Directories  
Index Copernicus Journal Master List

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Published in TURKEY

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## Message from the Editor-in-Chief

**Dear Colleagues,**

Today, technology is developing very fast around the world. This technological development (hardware and software) affects our life. There is a relationship among technology, society, culture, organization, machines, technical operation, and technical phenomenon. Educators should know this relationship because technology begins to affect teaching and learning facilities. For this reason educators are increasingly using technology in all aspects of their profession (e.g., creating curricula, classroom instruction, and work assignments). This trend can be enhanced by educating the educator about cultural and cognitive aspects of technology and techniques, as well as the associated advantages and disadvantages related to educational and human development goals.

When people think of “technology,” they tend to think of human artifacts such as machines, electronic devices, scientific hardware, or industrial manufacturing systems. However, a formal definition (College Dictionary) of technology indicates that it has a more general meaning which includes any “practical application of knowledge” or “manner of accomplishing a task”.

### DEFINITION OF “TECHNOLOGY”:

1 : *the practical application of knowledge* especially in a particular area...

2 : *a manner of accomplishing a task* especially using technical processes, methods, or knowledge...

3 : the specialized aspects of a particular field of endeavor <educational technology>

Human’s use of technology involves not only machines (e.g., computer hardware) and instruments, but also includes structured relations with other humans, machines, and the environment. In short, technology is more than a collection of machines and devices. To go beyond simplistic intuitions about technology requires investigation of the human mind and sociocultural environment as well as interactions with technological artifacts.

TOJET is also a technology which affects educators and education systems because it diffuses new development all around the world. It is always successful to diffuse new developments.

I am always honored to be the editor in chief of TOJET. I am always proud of TOJET for its valuable contributions to the field of educational technology.

TOJET is interested in academic articles on the issues of educational technology. The articles should talk about using educational technology in classroom, how educational technology impacts learning, and the perspectives of students, teachers, school administrators and communities on educational technology. These articles will help researchers to increase the quality of both theory and practice in the field of educational technology.

TOJET, International Final University and other international universities will organize the International Educational Technology Conference (IETC 2021) in September, 2021 in Lefkosia, TRNC.

### **Call for Papers**

TOJET invites article contributions. Submitted articles should be about all aspects of educational technology and may address assessment, attitudes, beliefs, curriculum, equity, research, translating research into practice, learning theory, alternative conceptions, socio-cultural issues, special populations, and integration of subjects. The articles should also discuss the perspectives of students, teachers, school administrators and communities. The articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to TOJET.

**January 01, 2021**

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**Prof. Dr. Aytekin İŞMAN**

Sakarya University

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## Analysis of the Obstacles to the Freedom and Independence of the Media in the World and Turkey

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### Abstract

Media freedom and independence are the pillars of a given democratic society. Since the media makes up the bridge between the political authority and the public opinion, its independence is crucial for the survival of democracy. However, the history of the media has always been paved with obstacles of different kinds. This paper examines the obstacles to the freedom and independence of the media in the world in general and Turkey in particular. The critical political economy of the media was used as the theoretical framework for the study and, as for the method, a qualitative analysis of secondary data was performed. The existing literature showed that media concentration ownership, commercial stakes, and political interference make up the main obstacles to media freedom and independence in the world. Also, the literature revealed that political interference, economic stakes, and the legal framework in which the media operate consist of the main obstacle to media freedom and independence in Turkey. It was revealed that even in countries where freedom of expression is guaranteed by the Constitution, the media still struggle to maintain a completely independent editorial policy. The negative world trends in media freedom and independence consequently imply a negative trend in democracy in the world. The rise of electronic journalism contributed significantly to the freedom and independence of the media. However, political power and digital capital control the media content, which often leads to censorship.

**Keywords:** Media freedom, media independence, political interference, economic stake, legal framework

### Introduction

The media makes up one of the most important mediation institutions in a State of law. To maintain harmonious relationships between the citizens and the leaders of a given society, the media must be free from economic and political interference. However, the relationships between the media and politics often denote either contradictions between the two or submission of the media to politics. In a state of law, contradictory ideas are key to collective deliberation. In contrast, an autocratic regime does not allow debates and public discussion when making decisions that concern its citizens. Despite the efforts made by human rights organizations and media associations, the challenge of media independence and freedom remains a long journey. In societies shaped by class struggles, the mainstream media make up the voice of the ruling class. Thus, the link between media groups and capital endangers the media's editorial freedom. Also, alternative media which often lack financial resources, fail to survive. In a country where the State is more powerful than the political ruler, freedom and independence of the mediation institutions are not endangered. In contrast, in a country where the ruler is more powerful than the State, the media falls under the control of political power. Whether regarded as a democratic mediation agency (Lievrouw, 2009) or as an ideological state apparatus (Althusser, 1971), the media has always played an important role in shaping the worldview of a given society. Therefore, the desire for a political ruler to control the media lies in the importance of the media. This control is often translated into restrictions and censorship.

Since the invention of the book, the media has been at the center of the struggle for democratic societies. The media make up the necessary condition of democracy, allowing ideas to confront freely. The claim for press freedom started in the seventeenth century. However, it took more than a century for this claim to appear in law books. Sweden was the first country in the world to establish press laws in 1766; Prohibition of restricting the right to broadcast is part of the country's Constitution. In 1776, the State of Virginia followed Sweden's path: Virginia's Law Act, the Basic Law of the State, states that no government can block the expression of press freedom. Later, the US Constitution adopted this principle. The first amendment to the American Constitution voted in 1791, stipulates that Congress will not make any laws restricting the press or freedom of expression.

Media freedom has deteriorated worldwide over the past decade. In some of the most influential democracies in the world, populist leaders have made joint efforts to reduce the independence of the media sector. While the threats to global media freedom are obvious, their impact on the state of democracy is what makes them dangerous. In general, the freedom and independence of the media are hampered by pressure from politics and capital. However, rivalry and rigorous autoregulation among media groups make it difficult for journalists to do their jobs in complete freedom and independence. Media freedom is not a universal phenomenon. Even in countries where it is protected by the law, the right to express and publish free opinions often contradicts the economic interests of the ruling class. Besides, this freedom cannot be fully experienced without corresponding responsibilities. According to the UNESCO (2018) report on global trends in freedom of expression and media independence, there are two main and different indicators in the analysis of media independence. The first indicator is editorial independence from the regulatory authorities, and the second is resistance to political and commercial pressures. In the same vein, Reporters Without Borders (RSF, 2019) stresses that freedom of the press is used only in a limited number of countries. The countries are mostly Western European countries, Eastern European countries, and North American countries. Nonetheless, Oceania, Israel, some African and Asian countries are exceptionally part of the list. According to the 2019 world media freedom index (RSF, 2019), Norway, Finland, Sweden, Netherlands, and Denmark are ranked as the 5 countries with the most media freedom out of 180 countries.

Turkey, which ranks 154th in the RSF index, is part of the countries where media freedom and independence remains very challenging. According to RSF (2019), politico-economic ties of media owners, intransparent distribution of public funds, and audience and market power geared towards media empires make up the factors that hamper media freedom in Turkey. The Press Freedom Index is the ranking of countries compiled and published by Journalists Without Borders, based on the organization's assessment of the press freedom records of the previous year. To compile the index, Journalists Without Borders developed an online survey of 87 questions that focus on several criteria. The degree of freedom of journalists in 180 countries is determined by combining the experts' responses into a survey prepared by the RSF. This qualitative analysis was combined with quantitative data on violence and abuse against journalists in the period under consideration. The categories of criteria and indicators determined by journalists without borders include pluralism, media independence, environment and self-censorship, legal framework, transparency, infrastructure, and fraud. The report showed that the freedom and independence of the media remain an angry question even in the most developed countries. Thus, the relationships between media and politics, media and capital, and between media groups create an endless struggle for power. However, in these power relations, it can be noticed that the media is the power that is subject to politics and capital.

This article is a theoretical study of media freedom and independence in the World and Turkey. Based on different reports and studies, this paper identified three main barriers to the independence and freedom of the media which are global media concentration, political interference, and economic pressure. Furthermore, based on Kurban and Sözeri (2013)'s research, the present study identified three main obstacles to the freedom and independence of the media in Turkey. These obstacles are legal issues, political pressure, and economic influence. Since the article focuses on media freedom and independence, understanding the political, economic, and legal framework in which the media operates requires a look at the theory of the political economy of the media.

### **The critical political economy of media**

Power relations between antagonistic forces make up an obstacle to press freedom worldwide. Social research based on the political economy of the media views the political and economic structure of the media system as the source of the problem of freedom of press and independence. According to Hardy (2014), the first scientific study on critical political economy dates back to the late 1960s and early 1970s. The political economy of communication is related to the relationship between politics and the economy with communication. While the neoclassical approach to the political economy regards communication as a technical tool that serves the political and economic power, the critical political economy sees it as a complex process (Başaran & Geray, 2005). This complex process requires a comprehensive analysis that involves history, social integrity, moral philosophy, and praxis. Thus, more than a means to an end, the concept of communication makes up a crucial determinant of social interactions. Mosco (2009) provides a conception of communication that highlights social relationships. In the same vein, Hardy (2014) stresses that the critical political economy of communication addresses power relations that make up social hierarchies.

For this reason, the critical political economy analyzes how capital and politics affect communication practices by shaping people's perception and social representations of reality. Political power and capital make up structural forces that manifest themselves in trade and the international division of labor. Herman and Chomsky

(1988) emphasize the weight of the owners' group in the production of media content. As a result, the editorial line of the media is determined by these structural forces. Thus, the media's editorial line is viewed as a propaganda model closely intertwined with the geopolitics of information.

McQuail (2005) identifies seven basic assumptions related to the political economy of the media. The first assumption emphasizes the importance of logic and economic control. Economic control of the media hampers the possibility of citizen participation in the production of media content. The second assumption stresses that the media structure tends to intensify. In the third assumption, McQuail states that the global integration of the media tends to develop ceaselessly. The fourth assumption highlights the commodification of media content and audiences. The fifth assumption emphasizes the decrease in media diversity. The lack of diversity in the media landscape maintains the logic of single thought imposed by the ruling class. In the sixth assumption, McQuail claims that the dissenting and alternative voices have been neglected. Finally, he stresses that private interests override public opinion.

This study aimed to examine the obstacles to the freedom and independence of the media in the world and Turkey. The methodology of this study includes a secondary analysis of research and reports related to the topic under study. Thus, a qualitative analysis of the existing literature was conducted. According to Creswell (2012), the qualitative research method explores a problem and develops a detailed understanding of a central phenomenon.

### **The obstacles to freedom and independence of the media in the world**

According to the 2019 House of Freedom report, in some of the most influential democracies in the world, large segments of the population no longer receive unbiased news and information. This is due to the interference of politics and capital in the production of media content. Common methods include state-sponsored property changes, regulatory and financial pressure, and reporting honest journalists. Governments have also provided proactive support to friendly media outlets through measures such as profitable government contracts, appropriate regulatory decisions, and preferential access to government information. The aim is to make the press serve those in power instead of the citizens. In Europe, the problem arose with right-wing populism that undermined fundamental freedoms. The government of Viktor Orbán in Hungary and that of Aleksandar Vučić in Serbia has had great success in eliminating critical journalism. Both leaders concentrate media ownership in the hands of peer groups, enabling organizations with the widest reach to support the government. In Hungary, where the process of media freedom and independence seems to improve, about 80 percent of the media belongs to government allies.

In Eurasia and MENA, the media faced the intensification of traditional challenges last year. Examples include new legislative restrictions in Belarus, a rise in arrest and conviction in Lebanon, and insecurity and death in a war-torn Yemen. As a result, the concentration of the media, political interference, and economic interests are the main obstacles to the freedom and independence of the media in the world. The following section highlights the problem of media concentration in the world.

### **Media ownership concentration as an obstacle to media freedom and independence**

Media ownership concentration makes up an increasing trend in developed countries. Large media groups strengthen by controlling more and more newspapers, radios, and television. In such a context, information is an economic data whose value is measured by its mass audience. Global media groups include Bertelsmann, National Amusements (ViacomCBS), Sony Corporation, News Corp, Comcast, Walt Disney Company, AT&T Inc., Fox Corporation, Hearst Communications, MGM Holdings Inc., Grupo Globo (South America) and the Lagardère Group (France). According to Noam (2016), major media groups and companies have attracted attention, fear, and anger. Also, the media is increasingly controlled by a growing number of firms, which can influence public opinion, national agenda, democracy, and global culture. Therefore, media concentration is defined either according to the concepts of ideological pluralism and ownership diversity.

Cappello (2016) distinguishes between two indicators of media ownership concentration: horizontal media concentration and cross concentration of media ownership. The horizontal concentration reflects the level of control that one or more media owners can apply in a particular industry. The cross-media concentration denotes the degree of control applied by one or more media owners in several other economic sectors. Cappello (2016) states that horizontal concentration indicators can be identified in four media sectors: the television, the radio, daily newspapers, and Internet-based services. The cross-media concentration indicator follows the same logic as in horizontal media concentration. Thus, once legal provisions to prevent cross-media concentration has been determined, the indicator makes it possible to effectively enforce these provisions. In both horizontal and cross

concentration of media ownership, the relevant framework is determined by the supervisory authorities whose role is to ensure effective compliance with the legal provisions.

Cappello (2016) stresses that media pluralism is one of the foundations of freedom of expression. The concept of media pluralism encompasses a set of media actors and a large number of operators to prevent excessive market concentration. Therefore, media pluralism makes up the solution to the problem of media concentration. Given the situation in Europe, Cappello (2016) emphasizes that convergence may be an important regulatory institution. Besides, the opportunities offered by the internet do not imply that the diversity of the media can only be protected by new technological developments. Traditional broadcasting continues to be an important source of information for many European citizens, meaning that legal provisions to impede media ownership concentration should also be enforced.

İCRİ (2009) sets the metrics and indicators to measure the concentration of media ownership. The study indicates that the risk of high ownership concentration is considered high if the four main media owners have a market share of more than 50% in the same country. If the market share of the four main media owners is 25 to 49% in the same country, the risk of high ownership concentration is considered moderate. Finally, if the market share of the four main media owners in the same country is below 25%, the risk of ownership concentration is therefore low.

Brogi et al. (2017) revealed that the concentration of media ownership and the commercial impact on editorial content are the indicators that hamper the independence of media the most. In Europe and with a score of 71%, Bulgaria is among the countries with the highest media concentration risk. This score is largely explained by the fact that rules restricting the concentration of property in Bulgaria are not implemented. The Media Reform Coalition (MRC, 2019) 2019 report shows that only three companies (News UK, Daily Mail Group and Reach) control 83% of the UK's national newspaper market. In France and Spain, according to Sciences Po LIEPP (2016), the media tends to belong mostly to private companies (almost 80% in France and 46% in Spain). In France, 51% of printed and online media are controlled by companies in the financial and insurance services industry. These companies created complex and opaque partnership structures that make it difficult to recognize the ultimate owner. In Germany, media pluralism is weakening slowly but steadily due to the closure of more newspapers and publishers for economic reasons. However, even countries that show a 5% media ownership concentration level show a high level of audience concentration. According to Brogi et al (2017), it seems that revenues and audiences continue to concentrate around a small number of providers, especially around established traditional companies and those that are successfully expanding to online markets.

### **Political interference as an obstacle to media freedom and independence**

The interference of political power negatively affects the freedom and editorial independence of the media. If the control of the ownership of media outlets remains a strategic political weapon, the control of the content of media discourse is even more important to the manipulative politician. This control is even more intense in countries where the political regime has more power than the state itself. In a study on media pluralism among European countries, Brogi et al. (2017) identified five indicators of the media's political independence: political control over media outlets, editorial autonomy, the process of democratic elections and the media, the regulation of resources of the states and support for the media sector, and independence of funds. Similarly, Reporters Without Borders (RSF, 2019) revealed that countries such as Sweden, France, Germany, Portugal, Belgium, Denmark, the Netherlands, and the UK show a low risk for political independence. In contrast, the study showed that the four countries experienced the highest risk of political influence on their media. These countries are European Union member states Hungary and Slovenia and candidate countries Montenegro and Turkey.

According to Hallin and Mancini's Media and Policy Tree Models (2004), Belgium, Denmark, and Sweden belong to the democratic corporatist model, which is characterized by the professionalism and self-regulation of journalism. Evidence from the monitor confirms the effectiveness of self-regulation in these countries, which acts as a shield to protect the media and journalism from political influence. European Union candidate countries, Montenegro and Turkey, show a considerable level of political influence on the media. Consequently, these countries need to ensure complete media freedom, which is a prerequisite for democracy (Brigo et al, 2017).

The United States is ranked 48th in media freedom ranking. According to RSF (2019), media freedom continued to decline in the second year of President Donald Trump. Rhetoric attacks from the government and private individuals have become increasingly hostile. These attacks became physical when an armed person entered the Capital Gazette newsroom in Maryland in June 2019, killing four journalists and one employee in a targeted attack on the local newspaper. Since then, President Trump has continued to regard the press as an enemy of the

American people. He also uses the expression "fake news" in an attempt to discredit critical reporting. In France, attacks and harassment targeting media and journalists increased tremendously in 2018. Journalists are insulted, threatened, and attacked by politicians and protesters who claimed that the media do not give enough space to dissenting voices. The Yellow vest protest that started in November 2018 makes up an example as to how complicated are the relationships between the media and social protesters. Furthermore, although the German constitutional favors and environment for independent journalism in Germany, far-right groups and protestors continue to threaten, harass, and even physically attack journalists. This alarming trend that emerged in 2015 intensified in 2018.

According to RSF (2019), Turkmenistan is the country with the least media freedom and media independence in the world. The Turkmen government controls all the media and few internet users can only access a censored version of the internet. The harassment of a small number of journalists working secretly for media outlets residing abroad continues to grow. In recent years, many of these journalists have been arrested, tortured, physically assaulted, or forced to abandon their job. A new law provides favors the implementation of private television channels, provided that they convey a positive image of Turkmenistan. In Russia, which is 140th in the world press freedom index, the pressure on independent media has increased steadily since the great anti-government protests in 2011 and 2012. According to RSF (2019) and House of Freedom (2019), leading independent news organizations have either fallen under the control of political power or slowly disappeared. As TV channels continue to expose viewers to propaganda, the political environment has become very oppressive to those who question new patriotic and neo-conservative discourse. Never have more journalists and bloggers been imprisoned since the collapse of the Soviet Union.

As for the American continent, Cuba, ranked 169 out of 180 countries, is the country with the least freedom of press and media independence. Cuba, which is a distinctive socialist republic and a one-party state, continued to be the worst media freedom violator in Latin America. In place since 1959, the regime maintains a total media monopoly and the constitution prohibits private media. Several Cuban bloggers and independent journalists are threatened by the government and are often monitored by security agents who take them to query and delete information on their devices.

Eritrea, which ranked 178th out of 180 countries, is the African country with the least freedom and independence of the media. The peace agreement signed with Ethiopia in 2018 did not lead to any relaxation in the dictatorship, which left no room for freely reported news and information. According to a UN report (2016), the media in Eritrea is subject to the whim of President Issayas Afewerki, a press freedom hunter accused of crimes against humanity. Radio Erena is the only independent and politically non-partisan radio station that broadcasts news and information to Eritreans for free, but its coverage signal is often blocked in Eritrea.

As for the Middle East, the 2019 RSF report revealed that Syria is the Middle East country with the lowest media freedom and independence (RSF, 2019). The war, which somewhat favors the survival of citizen journalism in Syria, is among the reasons that explain the political control over the media. The risk of arrest, abduction, and death in Syria makes journalism an extremely fragile and dangerous activity. At least 10 journalists were killed in 2018. Three of these journalists were killed in conditions that remain unclear. Although the 2011 uprising led to the creation of new Syrian media, few of them survived the political pressure.

According to Dankov et al. (2003), control is understood more broadly than ownership as it includes both direct ownership and indirect control. Indirect control implies that parties, partisan groups, and politicians are not directly involved in the ownership structure but use their power through intermediaries. They also noticed that conflict of interest was often the cause of tension between the media and political power. Conflict of interest is defined as the incompatibility of the government agency with media ownership (Djankov et al., 2003). Therefore, transparency in media ownership is an important prerequisite for assessing the independence of the media. Regardless of the media's ideological stance and editorial line, the concentration of media ownership and political interference are the main obstacles to the independence and freedom of the media in the world.

### **Commercial stakes as an obstacle to media freedom and independence**

In the postmodern era, the role of the media is becoming more and more important in the field of marketing and advertising. If the freedom of the media goes hand in hand with its financial independence, it follows that capital has a powerful influence on the editorial line of the media. According to Gwartney and Lawson (2003), economic freedom of the media implies that the media are free to choose between goods and services while volunteering with others in a competitive market. Governments promote economic freedom when they establish a legal framework that ensures respect for property rights and enforcement of contracts. This legal framework is

breached when governments change the coordination of economic activities by imposing trade and entrepreneurship regulations and restrictions.

The link between economic freedom and press freedom was formally established by Nobel Prize Winners, Friedman (2010) and Hayek (2013). The authors emphasize that the curtailment of economic freedom leads to a reduction in civil and political rights, including the right of citizens to express their opinions. According to Brooke and Déry (2018), the degree of control of political power over the economy has an impact on information providers. The study showed that places with a high degree of economic freedom are places where fewer journalists are attacked. Those are places with the least laws and regulations applied to the media and with the least political pressure to control media content.

Brogi et al. (2017) emphasize the commercial impact on the editorial line of the media. The financial independence of the media stems from the relationship between commercial impact and ownership concentration. In such a context, producing free content is a risky challenge for the media. In the UN report on global trends in press freedom (2017), the impact of trade on media independence is viewed as a form of capture. In this perspective, the capture of the media is the loss of the media's ability to make up the bridge between political leaders and citizens. Instead, the media serves the purposes and needs of capital. The capital affects the editorial content of the media and prevents their independence through advertising and other financial support. The ethical problem is that, despite the cooperation between media and capital, some media outlets pretend to be free and independent.

### **The obstacles to the freedom and independence of the media in Turkey**

In "The Media in the wheel of Politics: the political, legal, and economic obstacles to freedom and independence of the media in Turkey", Kurban and Sözeri (2013) highlights the historical power imbalance between media and its political, legal and economic counterparts. Historically, the influence of political power on and the media content has always been significant. Also, the Turkish media have never been exempted from the ideological polarization and excessive politicization of society. The media's decision as regards the actors allowed to participate in political and social debates makes up a reflection of the social, economic, and political transformation of Turkey that started in the 1980s. The economic liberalization and the process of democratization of the country caused a structural, technological, and ideological transformation of the media sphere. According to Kurban and Sözeri (2013), the obstacles to the freedom and independence of the media in Turkey can be classified into three categories: political, economic, and legal.

### **The political obstacles to the freedom and independence of the media in Turkey**

According to Elmas and Kurban (2011), since the emergence of the press in Turkey, journalists have played a major role in the modernization of republican institutions. However, the press has always been the target of pressures from political power. In the 2019 RSF report, Turkey ranks 157th out of 180 countries as regards media freedom and independence. According to the report, the dismantling of dozens of media and the affinities between the largest Turkish media group and political power have completely undermined media pluralism in Turkey. Political pressure thus hampers editorial pluralism and the free expression of journalists.

The existing literature on the relationship between political power and media in Turkey falls uses a critical approach. The literature regards journalists as victims without emphasizing their responsibility to produce and share impartial and accurate information. Pierini and Mayr (2013) state that the government interferes directly with media affairs in response to personal and policy criticism. As regards the tense relationship between the Turkish and the media, Erdem (2018) stresses that Turkey has moved away from the Western understanding of democracy since the 2016 failed coup attempt. Erdem identifies two basic forms of political interference in the media policy in Turkey. The first form of political interference is to encourage flexible businessmen to buy the mainstream media by obtaining preferential loans from public banks. The second form of political interference stems from direct political pressure on media owners. In short, the literature related to the political obstacles related to media freedom in Turkey showed a shared media stance towards political power over several decades. The media expresses and promotes the interests of the political establishment. Also, not only did the weakened media affect the ownership structure but it also indirectly affected editorial policies and caused an increase in self-censorship.

### **The economic obstacles to media freedom and independence in Turkey**

According to Kurban and Sözeri (2013), the economic barriers to the independence and freedom of the media lie in the relationship between the media and the market structure. Liberalization policies in the 1980s facilitated the transition from other sectors to the media and changed the media ownership profile. However, Karlıdag and Bulut (2016) emphasize that the free market is not a necessary condition of free media. Instead, the strategic

relations between the government and the media led to the media's rapid commercialization. Although the media outlets were concentrated into small publishing companies at the early stage of advertising, the concentration of ownership of major media conglomerates started from the late 1990s to the early 2000s. Besides, a few of the major media groups that dominate the media market also operate in various industrial sectors (Kaya & Çakmur, 2011).

This situation changed drastically with the 2001 economic crisis and the regulations introduced to the banking sector. While media groups that invested in the banking and finance sector were more affected by the crisis, some of them completely disappeared from the market. It should be noted that some companies, including those operating in the media, were taken over by the Savings Deposit Insurance Fund (SDIF). The financial investment of the media sector in other business sectors makes up one of the most important reasons for the media ownership concentration in Turkey. Thus, the media makes up an element in larger business groups ruled by a closed circle of owners. Almost all media groups invest in sectors such as energy, telecommunications, finance, and construction (Sönmez, 2003; Bek, 2004; Adaklı, 2006).

According to Karlıdağ ve Bulut (2016), the current media ownership profile is a result of the neoliberal policies applied in the 1980s. Thus, favoritism results in the hyper-commercialization of the media, which constitutes a barrier to media freedom. It can be understood that favoritism between capital and the media is a condition for the media to survive. The problem is that this survival strategy does not meet the criteria for media freedom and independence, as outlined by Reporters Without Borders and Freedom House. Karlıdağ and Bulut (2016) note that the relationship between the state, capital, and the media creates an environment in which capital shapes the media's treatment and dissemination of information. This dependence of the media on politics and capital, as Touraine (1992) stresses, is an indication of the modern mode of production in which information and truth are supplanted by capital and power.

### **The legal obstacles to media freedom and independence in Turkey**

Legal restrictions related to national security issues are the main legal obstacles to the freedom and independence of the media in Turkey. Article 28 of the Constitution provides constitutional guarantees of press freedom in Turkey, it is incumbent upon the State to take the necessary measures to guarantee this freedom. Article 26 of the Constitution protects individuals' freedom to express and disseminate their opinions and thoughts. Citizens are also entitled to receive and share ideas without the interference of public authorities. Due to the European Union membership process, Turkey has made significant progress to increase the freedom and independence of the media. However, the process began to deteriorate in 2008 as journalists were accused of terrorist propaganda during major political investigations.

The Anti-Terrorism Law (TMK) and the Turkish Penal Code (TCK) are the primary sources of accusations against media professionals. The most common accusations and political cases against journalists are the following: leading a terrorist organization, becoming a member of a terrorist organization, providing support to a terrorist organization, propagandizing for a terrorist organization, and reporting a terrorist organization's statements as news. Akdeniz and Altıparmak (2018) emphasize that the state of emergency declared after the 2016 coup attempt contributed to the strengthening of legal measures against media freedom. Although the media, state, and capital seem to coexist, the media is not completely independent of the power of politics and capital.

Therefore, the legal framework which shapes the media's activities does not always meet the free-range expectations of the media. The road to media freedom and independence is paved with significant legal obstacles. Admittedly, excess in the media's freedom may create more room for rumors and propaganda. Since social media favors post-factual journalism, there is a need for a certain control of the media's freedom. According to Kurban and Sözeri (2013), despite the significant political reforms over the last 10 years, Turkey is still required to make substantial progress as regards the media's independence and freedom. The authors stress that real change is only possible with the overhaul of institutions and a radical change of mindset.

### **Conclusion**

The road to media freedom and independence worldwide is paved with many obstacles. World trends in freedom of expression and media independence revealed that journalists are not completely free to do their jobs even in most democratic countries. The existing literature review shows that media ownership concentration, political interference, and economic favoritism are the main obstacles to media freedom and independence in the world. In the case of Turkey, the literature revealed that political interference, commercial stakes, and legal constraints make up the main obstacles to the freedom and independence of the media. Although the media is often regarded as the fourth democratic power, it remains subject to its political and economic counterparts.

Media ownership concentration goes against the principle of media pluralism. The concentration of capital leads to the concentration of small and closed media groups. Capital favors small media groups, which help influence the media's editorial policies. Unexpectedly, the development of community and alternative media did not affect the steady media ownership concentration. Media companies are controlled by several companies in the USA, France, the UK, Turkey, and many other countries. Capital influences the concentration of media ownership, thereby shaping the media's discourse. Freedom of speech, although enhanced by social media, remains restricted for two reasons. First, ownership concentration continues to prevail in the era of social media. Social media platforms are controlled by capital, not by the users. Second, content delivered via social media platforms is monitored and frequently censored.

Political power plays an important role in influencing the media's discourse. The media's discourse contributes to shaping the public. The rise of nationalist right-wingers in some parts of Europe and America has worsened the relationship between media and politics. The concept of fake news in America has been the slogan of the government when facing media criticism. Media organizations in France are often accused of collaborating with financial institutions by groups of protesters. World trends in media freedom and independence show that journalists are accused by politicians of sharing fake news. Also, press workers worldwide are frequently the object of psychological and physical attacks.

The literature regarding media freedom and independence in Turkey shows several similarities with world trends. While media ownership concentration and political interference make up two significant obstacles to media freedom and independence in Turkey, the 2016 coup attempt caused the hardening of the legal framework in which the media operate. National security concerns and the tendency to tackle fake news have forced independent journalists to review their publication policies. In such a context, the media fail to meet the criteria for media freedom and independence. Among these criteria, pluralism and transparency are two indicators of media freedom that are yet to be fully achieved in many countries. Despite the obstacles mentioned above, media freedom and independence remains an internal process of democratic governance. Media freedom and independence are vital conditions for democracy to survive as the media makes up the bridge between governments and citizens.

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## Assistive Technologies Usage Skills Assessment Scale: Validity and Reliability Study

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### ABSTRACT

This study aims to develop an Assistive Technologies Usage Skills Assessment Scale (ATUSAS) that measures teacher candidates' assistive technologies usage skills. This study group consists of 510 teacher candidates' (282 female, 228 male). The scale's validity and reliability were statistically tested by computing the KMO and Bartlett tests, and via an exploratory factor analysis, descriptive statistics, Cronbach's alpha, a confirmatory factor analysis. As a result of the exploratory factor analysis, a construct consisted of 20 items, and three factors have been attained. The confirmatory factor analysis results have shown the adjustment to the sample that the scale applied to is at a reasonable level. The ATUSAS's Cronbach's alpha internal consistency reliability coefficient has been found as .90 for factor 1, .89 for factor 2, .73 for factor 3, and .92 for the whole test. The results show that ATUSAS is a valid and reliable measurement tool.

**Keywords:** Assistive technologies, technology, skills, teacher candidates, validity, reliability

### INTRODUCTION

Today, it has become inevitable that technology developments take place in the learning-teaching processes at schools, as in all other areas of our lives. The expectation from today's schools is to reach information by using technology and educating individuals who can use technology effectively. Teachers, school administrators, and supervisors, who are the common stakeholders, play a crucial role in realizing the potential benefits of using technology in schools at a high level. This rapid change in science and technology also affects individual and community life. The current education system aims to educate individuals who are open to change, are creative, and produce and use information. The term Assistive Technologies (AT), in the broadest sense, “refers to any set of scientific achievements (products, environmental modifications, services, and processes) useful to overcome limitations and/or improve function for an individual” (Cook and Polgar, 2014). Assistive devices and technology (ADT) “is any form of external tool specially designed and produced or generally available, whose primary purpose is to maintain or improve an individual’s functioning and independence, to facilitate participation, and to enhance overall well-being” (World Health Organization [WHO], 2014). Assistive technology is the tools used to facilitate the life skills of individuals affected by disability, to improve these skills and to boost their interaction with the environment as a whole (Fok, Polgar, Shaw and Jutai, 2011; Pettersson and Fahlstrom, 2010; Reed and Bowser, 2005). Assistive technologies that are used to overcome the difficulties that these individuals face during daily life due to their inadequacy is also used to increase their academic success (Lancioni, Sigafos, Reilly and Singh, 2013).

In recent years, rapid advancements and developments in technology have made use of assistive technology a necessity in in-class applications (Çakmak et al, 2016). Regardless of general education or special education, technological applications have been reflected in many fields and brought along significant transformations (Erdem, 2017). The technologies used in general education have also started to be used frequently in the special education field (Özdamar, 2016). However, the technologies used in special education vary according to the type or degree of individuals being affected by disability and vary from person to person (Çakmak et al., 2016; Erdem, 2017).

With the introduction of technology into educational environments, the teaching processes in classroom

environments started to be conducted with technology support. Technology-supported educational environments aim to design instructional materials appropriate to different learner characteristics. It enriches the teaching environments by adopting the methods and techniques used, thus creating easily accessible, effective, and efficient learning environments (Atanga, Jones, Krueger, & Lu, 2019). Technology-assisted learning environments and assistive technologies in planning the teaching process are recruited, and the motivation and success of the learner increase. Assistive technologies; These are special tools, services, and methods used to individualize the teaching of individuals with special needs, increase their independence and improve their quality of life (Atanga, Jones, Krueger, & Lu, 2019; Reed and Bowser, 2005).

Technological tools made it possible to use new methods and techniques in the learning process tools. Researchers emphasize that effectively used instructional technologies can improve the education system (Federici, & Scherer, (Eds.), 2012; Atanga, Jones, Krueger, & Lu, 2019). The spread of technology in the education process has led to changes in the faculties' education programs that train teachers and increase the number and hours of computer and instructional technology courses. Nevertheless, it can be said that in education faculties, technology education is generally limited to knowledge and skills, and it is tried to be provided with a technology course presented without any relation to other fields (Federici, & Scherer, (Eds.), 2012; Bausch & Ault, 2012).

In scale development studies, researchers need to define the property they want to measure well and clearly describe the appropriate items for this definition. From this point of view, it aims to develop a measurement tool for determining the assistive technologies usage skills assessment by considering the features related to assistive technology. There are some studies and instruments in the literature to discuss and measure various aspects of assistive technologies (Al-Dababneh, & Al-Zboon, 2020; Tofani et al., 2020; Leo, Medioni, Trivedi, Kanade, & Farinella, 2017; Zapf, Scherer, Baxter, Rintala, 2016; Federici, & Scherer, (Eds.), 2012). However, not much scale was developed in Turkish literature to determine assistive technologies usage skills. In this respect, it can be said that the issue of determining assistive technologies usage skills assessment has not been mentioned much by the researchers. In order to fill this gap in the literature, this study aims to develop an Assistive Technologies Usage Skills Assessment Scale that measures teacher candidates' assistive technologies usage skills.

**METHOD**

This research aims to develop an Assistive Technologies Usage Skills Assessment Scale that measures teacher candidates' assistive technologies usage skills. The stages followed in the development of the scale are given below.

**Research Group**

The research group consists of university students studying at the education faculty in TRNC in the 2018-2019 academic year. Among the students attending the education faculty, all students who have taken technology-supported teaching lessons are included in the research group. The characteristics of the students participating in the study regarding gender, age, and departments are summarized in Table 1.

**Table 1: Demographic Profile**

Measure	Items	Frequency	Percentage
Gender	Female	282	54.3
	Male	228	44.7
Age	21 years old and younger	150	29.4
	22 years old	140	27.4
	23 years old	94	18.4
	24 years old and older	126	24.8
Department	Classroom Teaching	122	23.9
	Special Education Teaching	190	37.3
	Pre-school Education Teaching	106	20.8
	Turkish Language Teaching	90	17.6
	<b>TOTAL</b>	<b>510</b>	<b>100</b>

As seen in Table 1, the sample is composed of 282 (54.3%) female and 228 (44.7%) male participants, of whom 150 (29.4%) of students are '21 years old or younger', 140 (27.4%) are '22 years old' (21.4%), 94 (18.4%) are 23 years old, and 126 (24.8%) are 24 years old or older. 122 of the students (23.9%) are studying in the Classroom Teaching program, while 190 (37.3%), 106 (20.8%), and 90 (17.6%) are studying Special Education Teaching, Pre-school Teaching, and Turkish Language Teaching, respectively. In the literature, the number of working groups was determined by considering the criteria given for factor analysis. Tavşancıl (2002) stated that "the working group's size should be at least five times the number of items in the scale".

### ***Development Process of the Scale***

In the first stage of scale development, the conceptual framework was revealed by reviewing the scale's factors' literature and statements. Question items consisting of a total of 25 items as part of the scale were created. Three experts in the Special Education field evaluated the question items created, two in Computer Education and Instructional Technologies field, one in the Measurement and Evaluation field, and expert opinion from the Turkish Education field. The experts were asked to make sure that the question items created were clear and understandable, and that they did not contain more than one meaning, and that they included usage skills for assistive technologies. As a result of expert opinions, some items were corrected and rearranged. Pre-testing, in the items determined in line with the expert opinions, was carried out with 20 students studying classroom teacher (5 students), special education teacher (5 students), pre-school teacher (5 students), and Turkish teacher (5 students). The students were asked to indicate the items they did not understand or had difficulty understanding the scale's question items. Some questions were rearranged in line with the information obtained as a result of the pre-test. As a result of the literature review, expert opinion, and pre-test application, a test form of the scale consisting of 21 items were created. All of the question items in the scale consist of positive statements. A 5-point Likert-type “(1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly Agree)” is used in the scale.

### ***Data Collection***

In the data collection, firstly, the purpose of the research was specified, and explanations about the scale were made to the participating students. Later, volunteers were asked to fill the scale. In this process, a total of 510 teacher candidates' filled the scale.

### ***Data Analysis***

Before starting the analysis of the data collected through the scale, the scales filled, by teacher candidates', with missing, erroneous, and only with specific extreme values, were reviewed. Validity and reliability analyses were performed in line with the results obtained from the teacher candidates. The study group (510 people) was randomly divided into two separate groups, and Exploratory Factor Analysis (EFA) was performed with the data obtained from the first group (n1), and Confirmatory Factor Analysis (CFA) was obtained with the data obtained from the second group (n2). Validity analysis of the Assistive Technologies Usage Skills Assessment Scale was carried out with content validity and construct validity. In determining the content validity, the opinions of three specialists working in special education and a specialist in the field of Computer and Instructional Technologies were used. In determining the construct validity of the scale, EFA and CFA were applied. Before doing EFA, Kaiser-Meyer Olkin (KMO) and Bartlett Sphericity tests were applied to determine if the data were suitable for factor analysis. Following the confirmation of the suitability of the data for factor analysis, EFA was performed using the Promax Rotation technique and principal components analysis to determine the scale's construct validity. As a result of EFA, it was determined how many factors the scale consists of and under what factors the scale items were grouped. After determining the factors that make up the scale, it was tried to determine the appropriate title for each factor based on the expressions related to the items in each factor. CFA was performed to test the conformity of the structure revealed by EFA. The fit and error indices obtained from CFA were analysed, and the structure emerging on the scale was evaluated. In order to determine the reliability of the scale, Cronbach's Alpha reliability coefficient was analysed separately for the whole scale and the sub-factors that make up the scale. SPSS 24.0 package program was used for EFA. IBM SPSS Amos 26 package program was used for CFA.

## **FINDINGS**

The data obtained in line with the analysis; (1) Evaluation of the suitability of the data for factor analysis, (2) Determination of the factor pattern, (3) Confirmatory factor analysis, (4) Name of the factors and (5) Reliability Analysis of the developed scale are given under the headings.

### ***Evaluation of the Suitability of the Data for Factor Analysis***

In the literature, it is stated that the number of participants (sample size) should generally be 5 to 10 times the number of items in order to perform factor analysis in scale development studies (Bryman, 2001). In this study, considering this criterion, EFA was performed on 255 participants' data, half of the entire 510 participants. Accordingly, it can be said that the recommended sample size has been adequately met. Before applying EFA, Kaiser-Meyer Olkin (KMO) and Bartlett Sphericity values were calculated to examine the data's suitability for factor analysis. It is stated that the KMO value between 0.7-0.79 is considered as middling, while 0.8-0.89 meritorious and 0.9 and above is considered marvelous. In this case, it is stated that factor analysis can be performed if the KMO value is higher than 0.70 (Çokluk, Şekercioğlu, Büyükoztürk, 2018).

**Table 2:** Kaiser-Mayer-Olkin (KMO) and Bartlett's Test of Sphericity Results

Kaiser-Mayer-Olkin (KMO) Measure of Sampling Adequacy		.917
Bartlett's Test of Sphericity	Approx. Chi-Square	2880.786
	df	210
	Sig.	.000
Cronbach's Alpha		.92

(p<.001)

The results of the Kaiser-Meyer-Olkin test are given in Table 2. As a result of the calculations, the KMO value was recorded as .92. The KMO value (.92) obtained in the study was determined as a value higher than the desired KMO value. From this value, it was concluded that the sample size was “mervelous” for factor analysis (Çokluk et al., 2018). In addition, the statistical result obtained from the Bartlett Sphericity test was found to be significant ( $\chi^2 = 2880,786$ , df: 210,  $p < .01$ ). The significant results obtained from the Bartlett Sphericity test indicate that the data came from a multivariate normal distribution. It can be said that the data obtained from the scale are suitable for factor analysis.

**Determining the Factor Pattern**

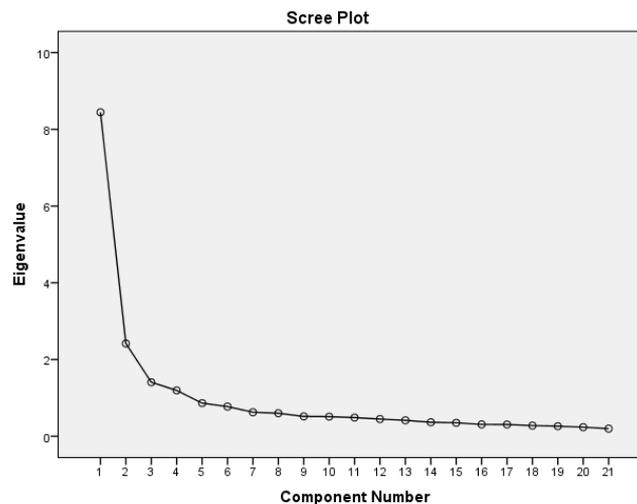
In order to reveal the factor pattern of ATUSAS, principal component analysis (PCA) used as a factoring method, and Varimax, one of the vertical rotation methods, was chosen as the rotation method.

Scree plot graph, eigenvalue, and variance percentages were used to determine the number of factors that can reveal the relationship between items (Çokluk et al., 2018). The table regarding the eigenvalue and variance percentages and the scree plot chart are given below.

**Table 3:** Factor Structures of ATUSAS

Factor	Eigenvalue	Variance Percentage	Total Variance Percentage
Factor 1	8.445	40.213	40.213
Factor 2	2.417	11.509	51.722
Factor 3	1.407	6.700	58.422

As a result of EFA, it is observed that for 21 items, the eigenvalue is above 1 for three components. Also, it is seen that 40.213% of the total variance is explained by the first component, 11.509% by the second, and 6.700% by the third component. In addition, it was found that it contributed 58.422% to the total variance.



**Figure 1:** Scree Plot for the Exploratory Factor Analysis

When the scree plot chart with eigenvalues on the vertical axis and factors on the horizontal axis is examined, it is seen that the high acceleration decline decreases after the fifth point. A factor is identified by each interval between

two points (Çokluk et al., 2018). In line with the data obtained from the eigenvalue and variance percentages and scree plot graph, it was decided to perform the analysis for three factors.

After determining the number of factors of the scale, the distribution of items to the factors was examined. In order to determine the items that have a strong correlation with which factor, the rotated component matrix was created (Table 4). Also, the matrix is used to investigate whether the items met the acceptance level of overlapping and factor load values. In order for an item to be overlapping, two conditions must occur. “i) The acceptance level of an item in more than one factor gives a high load value. ii) The difference between the load values of the item in two or more factors is less than .1” (Çokluk et al., 2018). In the exploratory factor analysis conducted in order to reveal the factor pattern of the ATUSAS, the factor load value was determined as .30.

**Table 4:** Rotated Component Matrix for ATUSAS

Items	Factor 1	Factor 2	Factor 3
s16	.759		
s18	.750		
s19	.749		
s17	.742		
s15	.741		
s14	.713		
s13	.680		
s21	.659		
s12	.567		
s20	.389	.383	
s7		.824	
s8		.819	
s9		.817	
s6		.738	
s10		.660	
s11		.584	
s1			.838
s5			.719
s3			.688
s4			.590
s2			.302

Extraction Method: Principal Component Analysis.  
 Rotation Method: Varimax with Kaiser Normalization.

When item factor loads are examined; Items that do not load any items (below .30), overlapping items, and items loading multiple factors were excluded from the scale. Accordingly, when Table 4 is examined, it is seen that, except for item 2, the load acceptance level of all items (.56) is high, and only one item (20th item) is overlapping. It is observed that the 20th item gives a load value of .389 in the first factor and .383 in the second factor. The 20th item was excluded from the analysis since the difference between two load values (.389-.383 = .006) of this item is less than 0.1. Also, it shows that these items are overlapping and that this item does not measure a single property. The factor pattern obtained as a result of the analysis made by excluding the 20th item from the analysis, the factor load values, and the common variances of the items are given in Table 5.

### Confirmatory Factor Analysis

According to the results of ECA, the scale consisting of 20 items and three factors was tested with Confirmatory Factor Analysis. Also, the goodness of fit indexes of the model was examined as a result of this analyzes. It has been stated that the most frequently used statistics of model-data fit with CFA are Chi-square ( $\chi^2$ ),  $\chi^2 / sd$ , RMSEA, RMR, GFI, and AGFI. The fact that the calculated  $\chi^2 / df$  ratio for the model is less than 3 is the perfect fit, and that it is less than 5 is an indicator of acceptable fit (Kline, 2005). Also, GFI and AGFI values higher than .90, and RMSEA values lower than .05 indicate model data compatibility (Marsh and Hocevar, 1988). However, if GFI is greater than .85, AGFI is greater than .80, RM,R, and RMSEA values are less than .10, it is accepted as acceptable lower limits for model data compliance (Anderson and Gerbing, 1984; Cole, 1987). According to the CFA studies results carried out for the research, GFI is .85, IFI is .89, NFI is .83. It is understood that the model has a good fit by calculating the RMSEA value as .075, CFI as .89, and AGFI as .80. Chi-square statistics are indicated as a lack of index fit (Stapleton, 1997). Doğan and Başokcu (2010) emphasized that the small test statistic is suitable for the observational structure. The sizeable statistical value indicates that the model does not fit the observational structure, that is, the model does not adequately explain the observed structure. Since chi-square statistics are

aggregated statistics, the higher the number of variables, the higher the chi-square/degree of freedom is used (Doğan & Başokcu, 2010; Çokluk et al., 2018). If this value is less than 5, the model is considered to have the goodness of fit, and if it is less than 3, the model is considered to have a very good fit (Byrne, 1994 act. Doğan & Başokcu, 2010). It can be said that the model created in the study is suitable for the observed structure, based on the results of chi-square/degrees of freedom operation results ( $477,363 / 167 = 2,858$ ) less than 5. The structure obtained for the model is presented in Figure 2.

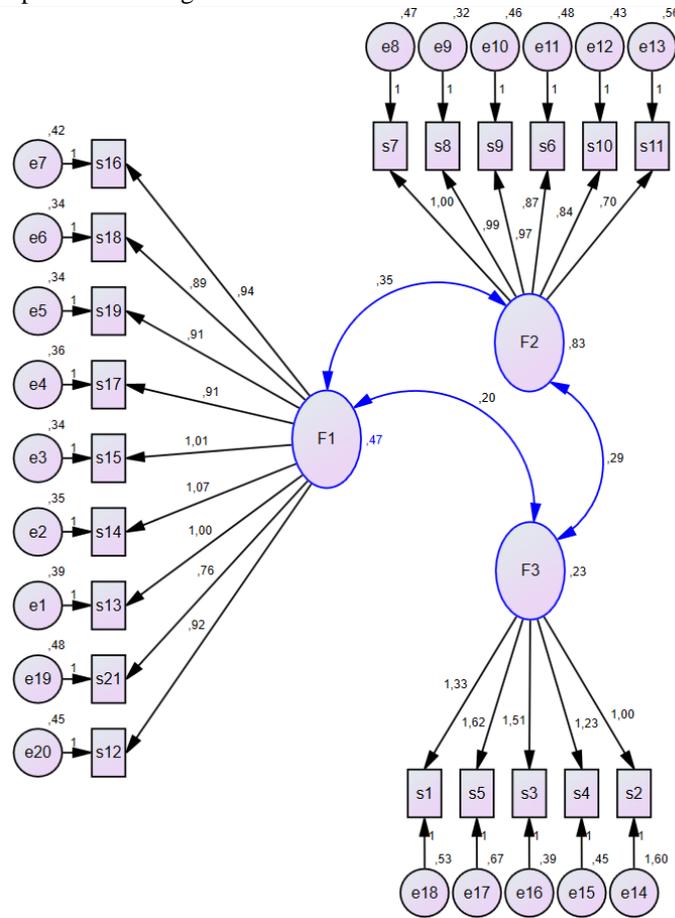


Figure 2: Path Diagram for ATUSAS

**Naming Factors**

As can be seen from Table 5, there are three factors in the ATUSAS. The first one is, “assistive technologies usage skills in the classroom” (S16, S18, S19, S17, S15, S14, S13, S21, and S12), the second one is, “Education material design and usage skills using assistive technologies” (S7, S8, S9, S6, S10 and S11), the third one is “assistive technologies usage skills” (S1, S5, S3, S4 and S2). Factor load values; It is observed that it varies between .77 and .58 for the first factor, .83 and .60 for the second factor, and .84 and .40 for the third factor. It is seen that the common factor variances of the items in the ATUSAS ranged from .84 (S1 item) to .40 (S2 item). This situation can be interpreted that there is homogeneity between the variables since the common factor variance is greater than .20 (Tabachnick & Fidel, 2001; Çokluk et al., 2018: 240-241).

Table 5: ATUSAS’s Transformed Factor Loads

Items	Assistive technologies usage skills in the classroom	Educational material design and usage skills using Assistive technologies	Assistive technologies usage skills	Common Factor Variance
s16	.766			.625
s15	.752			.599
s18	.750			.604
s19	.749			.600
s17	.748			.593
s14	.725			.622
s13	.692			.589

s21	.633		.433
s12	.576		.573
s8		.827	.753
s7		.826	.727
s9		.809	.712
s6		.735	.663
s10		.653	.633
s11		.603	.573
s1			.839
s5			.721
s3			.672
s4			.574
s2			.400

After the 20<sup>th</sup> item is excluded from the analysis, the contribution of the factors to the total variance is given in Table 6.

**Table 6:** Factor Structures of ATUSAS After Excluded Items

Factor	Eigenvalue	Variance Percentage	Total Variance Percentage
Assistive technologies usage skills in the classroom	8.229	41.143	41.143
Educational material design and usage skills using assistive technologies	2.417	12.083	53.225
Assistive technology usage skills	1.390	6.948	60.173

As seen in Table 6, the contribution of factors to total variance is 41.143% for the first factor, 12.083 for the second factor, and 6.948 for the third factor. It is seen that the total contribution of these factors to variance is 60.173%. It can be considered sufficient in multi-factor patterns that the explained variance is between 40% and 60% (Çokluk et al., 2018).

**Reliability Analysis**

The result of the reliability analyzes regarding the factors of the scale and whole scale, which was finalized with 20 items, are given in Table 7. In order to reveal the reliability of the scale, Cronbach's alpha internal consistency coefficient was examined. Cronbach's alpha was calculated separately for the factors and overall scale.

**Table 7:** Reliability Statistics

Factors	Cronbach's Alpha
Factor 1	.904
Factor 2	.894
Factor 3	.732
<b>Total</b>	<b>.919</b>

As seen in Table 7, .90 values for Factor 1, .89 for Factor 2, .73 for Factor 3 and .92 for the whole scale (20 items) were calculated. The acceptable range of Cronbach's alpha is 0.7 or higher for reliability (Yaratan 2017). These indicate that the reliability of the factors and the whole of the scale is in the acceptable range.

**DISCUSSION AND CONCLUSION**

In this study, Assistive Technologies Usage Skills Assessment Scale was developed. The study sample consisted of a total of 510 teacher candidates studying at the Faculty of Education. To develop Assistive Technologies Usage Skills Assessment Scale, the literature on the subject was reviewed, and a scale was set up, including 21 items. In line with expert opinions, expressions that were not suitable for content and that were ambiguous were corrected. The scale prepared in this way is rated in 5-point Likert Type.

Then, item-total correlations were examined in item analysis studies from the data obtained from the scale's application. In order to determine the validity of ATUSAS, its content validity and construct validity were examined. Expert opinions were consulted for content validity. EFA and CFA were used for construct validity. SPSS 24 package program was used for EFA. IBM SPSS Amos 26 package program was used for CFA.

As a result of EFA, a construct consisting of 20 items and three factors, which explains 60.17% of the total variance, was obtained. In line with expert opinions and the literature; the first factor was named as "Information technologies usage skills in the classroom", the second factor was "Education material design and usage skills using information technologies", and the third factor was "Information technology usage skills". The accuracy of the construct obtained for ATUSAS was tested with CFA. By examining the fit index values obtained from CFA, it was seen that the data were compatible with the model at an acceptable level. In summary, the scale consisting of three dimensions was valid, and the CFA result showed that the model was compatible.

In order to reveal the reliability of the scale, Cronbach's alpha internal consistency coefficient was examined. Cronbach's alpha reliability coefficient was calculated separately for the factors and the whole scale. The results showed that the scale was reliable (the whole scale  $\alpha = .919$ ; 1<sup>st</sup> factor  $\alpha = .904$ ; 2<sup>nd</sup> factor  $\alpha = .894$ ; 3<sup>rd</sup> factor  $\alpha = .732$ ) as it meets the  $\alpha = .70$  or higher criteria required for reliability (Nunnally, 1978; Şencan, 2005). EFA was carried out in order to contribute to the construct obtained with CFA. The results obtained showed that the resulting construct was acceptable.

Most people generally think assistive technology compels purchasing expensive hardware or software specially designed to meet a particular student's precise needs, and that requires extensive training to use them (Koch, 2017). However, there are assistive technology components built into the operating systems of various mobile devices, Microsoft and Mac/Apple computers that do not require additional software or hardware other than what comes installed in them (Apple, 2020; Microsoft, 2020; Android, 2020).

The developed scale is an effective data collection tool in revealing teacher candidates' assistive technologies usage skills. Within the Turkish literature framework, it is anticipated that the scale studies on assistive technologies are not sufficient in number, and this developed scale will constitute an essential reference for the studies to be conducted.

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## Compare Teachers and Students Attitudes According to Mobile Educational Applications

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### Abstract

Many definitions of education have been made from past to present. The definition of education, which is generally defined as the process of creating behaviour change in the desired direction in individuals, has a history as old as human history. From another point of view, education is the sum of the process that takes the individual from birth to death and develops talent, attitude and other behaviours that have value in the community where he lives. It is possible to talk about the use of mobile education application increasing day by day, although it is not at the desired level in the field of education. It is seen as the pervasive use of mobile devices and a part of life; it is not possible to say that the advantage of continuous transport is fully utilized. In this context, in this study that we carried out to measure the attitudes of teachers in the field towards mobile education applications and to compare these attitudes with the students in the education faculty, it was made to determine how much teachers and students continuously use the smart devices they carry with them in the field of education and training, and whether they use the advantages they provide. To find answers to the research questions, the study was designed with a “quantitative research method” and was carried out with “descriptive research design”. According to Sönmez and Alacapınar (2014), “descriptive research can be considered as a description of what is happening, what already exists, what is happening, and explained” (p: 47). From this point of view, it was tried to determine what the opinions of teachers and teacher candidates in the profession about mobile education applications and whether the difference between these views is meaningful or not.

As a result, the attitudes of teachers and prospective teachers towards mobile education devices are positive in this research, which aims to determine what opinions of teachers and prospective teachers about mobile education practices and whether the difference between these views is meaningful. The fact that the difference between these views is not significant is similar in the literature. These results suggest that attitudes towards new education applications to be used on mobile devices are also positive. Mobile technologies support individual and collaborative learning thanks to their rapidly developing applications and easy network access, allowing individuals to research, share information and access information at any time. The use of new technologies and software in education creates new learning opportunities for students and teachers. This explains the importance of individuals being open to using new technologies and accepting these technologies.

**Keywords:** Education, technology, mobile education, applications, new trends

### Introduction

Many definitions of education have been made from past to present. The definition of education, which is generally defined as the process of creating behaviour change in the desired direction in individuals, has a history as old as human history. From another point of view, education is the sum of the process that takes the individual from birth to death and develops talent, attitude and other behaviours that have value in the community where he lives. In parallel with this, innovations are made in education to raise individuals who can keep up with the developments in the changing and developing world, respond to the expectations of the era, research, question and realize themselves, develop the self-confidence and thus increase the student achievement levels and make the education system more functional (Çelen, Çelik & Çelik Seferoğlu, 2011). The common point of these definitions is that it covers all the processes that are effective in gaining the society standards, beliefs and life paths.

The developments in the technological field with the information age not only affect all areas of life but also cause radical changes in the education and learning process. Mainly, the inclusion of new technological devices and the internet in the education process has made education and technology more interrelated and usable than ever before. With the use of the Internet in the field of education, the e-learning method has started to be applied primarily. E-learning supports and facilitates learning by using information and communication technology (Asandului & Ceobanu, 2008). At this point, e-learning takes education beyond the classroom environment; it eliminates geographical boundaries. It is not possible to talk about spatial freedom, even if it has temporarily removed its limitations (Duran, Önel and Kurtuluş, 2006). E-learning, which is considered as a supplement to

education in traditional schools and classrooms, is a form of education that is carried out using visual objects, simulations and games. E-learning does not fully liberate the student. Since the users can access the content from their fixed places, "spatial freedom" cannot be fully mentioned in the e-learning process. With the development of communication technologies, mobile communication tools are included in the training process. For the individual to keep up with the changing and rapidly developing time, he needs to follow today's technology carefully and use it most efficiently. These developments have led to the realization of mobile education.

The effects of smart devices and applications installed on these smart devices, which are among the most essential products of successive developments and innovations, are frequently seen in all areas of our lives. As the time to use these devices and applications increases, their advantages and limited effects are also seen. Among its advantages are the support of learning, ease of use and being attractive. Limited aspects include the lack of software and the possibility of attracting the user's attention in other directions.

When we look at the definition of mobile education, Harris (2001), m-learning intersects mobile computing and e-learning to produce learning experience anytime, anywhere; Traxler (2005), any learning initiative where single or dominant technology is portable mobile devices; Trifonova (2003), on the other hand, provides all kinds of learning and teaching activities through mobile devices or mobile environments, Traxler (2007), mobile learning, compact digital portable devices that can fit in a pocket or bag, have a reliable connection and can be transported individually. Communicating with each other is defined as any activity that allows individuals to be more productive by mediating the creation of information.

In this context, the attitudes of students and academicians, which are the essential components of mobile education applications, are essential. In the study of Menzi, Önal and Çalışkan (2012), the opinions of academicians on the use of mobile technologies in education were examined within the framework of the components of the technology acceptance model that examines the behaviours of individuals to accept and use technology. According to the findings obtained from the study, some of the academicians (33%) stated that they use mobile technologies and all of them think that they intend to use them in the future. It is also stated that these technologies will be very beneficial both in terms of their academic development and learning and teaching activities. When looking at student attitudes from another point of view, striking findings regarding the attitudes of prospective teachers were obtained in the study prepared by the descriptive research method with the quantitative research method regarding the attitudes of the teacher candidates of Sağır and Göksu (2016) towards mobile education applications. It has been observed that pre-service teachers' positive attitude towards mobile devices and their use in all areas of their lives, regardless of gender, class, age and department, positively reflected on their attitudes towards mobile education applications.

It is possible to talk about the use of mobile education application increasing day by day, although it is not at the desired level in the field of education. It is seen as the pervasive use of mobile devices and a part of life; it is not possible to say that the advantage of continuous transport is fully utilized. In this context, in this study that we carried out to measure the attitudes of teachers in the field towards mobile education applications and to compare these attitudes with the students in the education faculty, it was made to determine how much teachers and students continuously use the smart devices they carry with them in the field of education and training, and whether they use the advantages they provide.

In the light of this information, answers to the following questions were sought:

1. What are the attitudes of teachers and students and whether they have enough information to use mobile devices?
2. Is there a significant difference between the satisfaction of students and teachers regarding the use of mobile education applications?
  - a. Is there a significant difference between the attitudes of students and teachers about the effectiveness of mobile devices?
  - b. Is there a significant difference between the attitudes of students and teachers about the usefulness of mobile devices?
  - c. Is there a significant difference between the motivation of students and teachers regarding the use of mobile education applications?

## Method

To find answers to the research questions, the study was designed with a "quantitative research method" and was carried out with "descriptive research design". According to Sönmez and Alacapınar (2014), "descriptive research can be considered as a description of what is happening, what already exists, what is happening, and explained" (p: 47). From this point of view, it was tried to determine what the opinions of teachers and teacher

candidates in the profession about mobile education applications and whether the difference between these views is meaningful or not.

### Sample Detection

To collect data for the study, the "Attitude Scale for Mobile Learning" (five-point Likert) developed by Demir and Akpınar (2016) was applied online using the "purpose-appropriate sampling technique". Purposeful sampling technique is an unlikely random sampling technique. Depending on the purpose of the study, it allows us to conduct in-depth research by selecting information-rich situations. It is preferred when it is desired to work in one or more particular cases that meet certain criteria or have certain features. In the context of selected situations, the researcher tries to understand nature and social events or facts and to discover and explain the relationships between them (Büyüköztürk, Çakmak, Akgün, Karadeniz, & Demirel, 2017).

This study was attended by students studying in the Faculty of Education and teachers in different branches of the profession voluntarily using the scale designed online. The scale was answered by 305 students and 226 teachers.

### Data Collection and Analysis

“The original of the Attitude Towards Mobile Learning Scale has a total of 52 items, 41 positive and 11 negatives. The items created are five-point Likert type, and they are completely graded (5), agree (4), partially agree (3), disagree (2), absolutely disagree (1). The loadings of the items in the final form consisting of four sub-factors and 45 items of the scale are between .82 and .40. This scale was applied by researchers to another group equivalent to the research group. After factor analysis, item analysis, item analysis based on the upper and lower group averages, internal consistency coefficient and correlation coefficients between factors, it was decided to exclude two items from the scale, and the scale was finalized. The recalculated Cronbach Alpha internal consistency coefficient was determined as .95 for this scale.

The data set obtained from the scale was interpreted by making t-Test analyzes for independent samples in SPSS 20.0 program. Since there was no intervention in the environment by the researchers, there was no need to obtain an ethics committee permit because the case, process and results were not manipulated by the researchers and the researchers voluntarily participated.

### Findings

The findings of the research obtained for sub-purposes are given in the form of titles. With the help of the scale used within the scope of the research, data were collected by applying “attitude scale towards mobile learning” to teachers and prospective teachers. The results obtained were analyzed with the t-Test. The first question of the research is "What are the attitudes of the students and teachers about whether they have enough information to use mobile devices?" It was expressed as. The table regarding the analyzes made to look for answers to this question is as follows:

Table 1: Average of attitudes of students and teachers towards mobile education applications

Group	N	Mean	Standard Deviation	df
Teacher	225	2,9	,33	724
Student	500	3,0	,43	

The attitudes of prospective teachers and teachers towards mobile education applications were examined with the t-Test. The average of the attitude points of the 500 teacher candidates who completed the scale (X: 3.0) and the average of the attitude points of the teachers (x: 2.9) were determined. From this point of view, it can be said that both students 'and teachers' attitudes towards mobile education applications are moderate. When the sub-factors affecting the attitudes of teacher candidates and teachers are analyzed, satisfaction with mobile education applications, their effectiveness and usefulness, and finally, their contribution to their motivation in educational environments were analyzed. The findings of this analysis are given below, and the results are interpreted.

### Satisfaction with Mobile Education Applications

The first sub-problem of the second question of the research is "Do the attitudes of students and teachers towards using mobile devices change according to their satisfaction levels?" determined as. The table regarding the analyzes made to look for answers to this question is given below.

Table 2: Average satisfaction level of teachers towards mobile education applications

Group	N	Mean	Standard Deviation	t	df	p
Teacher	225	3,605	,472	,761	657	,447
Student	500	3,564	,732	,868	626,785	,386

Satisfaction attitudes of teachers and prospective teachers towards mobile education applications were examined with the t-Test. For the teacher ( $t_{0,05: 657} = ,761$ ), For the teacher candidate ( $t_{0,05: 626,785} = 868$ ). According to these results, there is no significant difference between teacher candidates' satisfaction with mobile education applications ( $\bar{X} : 3,605$ ) and teachers' average satisfaction ( $\bar{X} : 3,564$ ). From this point of view, it can be said that both students and teachers are moderately satisfied with mobile education applications, but there is no significant difference between groups.

### Effectiveness of Mobile Education Applications

The second sub-problem of the second question of the research is "Is there a significant difference between the attitudes of students and teachers about the effectiveness of mobile devices?" determined as. The table regarding the analyzes made to look for answers to this question is given below.

Table 3: Average effect of teachers on mobile education applications

Group	N	Mean	Standard Deviation	t	df	p
Teacher	224	3,901	,484	-1,841	663	,066
Student	500	3,997	,701	-2,068	603,618	,039

The averages of teachers' and prospective teachers' attitudes towards whether mobile education applications are effective were analyzed with the t-test. For the teacher ( $t_{0,05: 663} = -1,841$ ) For the teacher candidate ( $t_{0,05: 603,618} = -2,068$ ). Accordingly, there is no significant difference between the averages of the pre-service teachers' attitudes towards the effectiveness of mobile education applications ( $\bar{X} : 3,901$ ) and the average of the teachers' attitudes ( $\bar{X} : 3,997$ ). According to this result, it can be said that both students and teachers find mobile education applications highly effective, but there is no significant difference between the groups.

### The Usefulness of Mobile Education Applications

The third sub-problem of the second question of the research is "Is there a significant difference between the attitudes of students and teachers regarding the usefulness of mobile devices?" determined as. The table regarding the analyzes made to look for answers to this question is given below.

Table 4: Average of usefulness of teachers for mobile education applications

Group	N	Mean	Standard Deviation	t	df	p
Teacher	225	3,411	,428	-,864	662	,388
Student	500	3,451	,636	-,976	614,839	,330

The averages of the attitudes of teachers and prospective teachers towards the usefulness of mobile education applications were analyzed with the t-Test. For teacher ( $t_{0,05: 662} = -,864$ ) For teacher candidate ( $t_{0,05: 614,839} = -,976$ ). According to the results of the analysis, there is no significant difference between the averages of teacher candidates' attitudes towards the usefulness of mobile education applications ( $\bar{X} : 3,411$ ) and teachers' averages ( $\bar{X} : 3,451$ ). Based on this result, it can be said that both students and teachers find mobile education applications to be moderately useful, but there is no significant difference between the groups.

### The Motivation for Mobile Education Applications

The fourth sub-problem of the second question of the research is "Is there a significant difference between the motivation of students and teachers regarding the use of mobile education applications?" determined as. The table regarding the analyzes made to look for answers to this question is given below.

Table 5: Teachers' average motivation for mobile education applications

Group	N	Mean	Standard Deviation	t	df	p
Teacher	225	3,730	,659	,685	718	,493
Student	500	3,686	,869	,758	559,419	,449

The average motivation of teachers and prospective teachers regarding the use of mobile education applications was analyzed with the t-Test. For the teacher ( $t_{(0.05; 685)} = 718$ ) For the teacher candidate ( $t_{(0.05; 758)} = 559.419$ ). Accordingly, there is no significant difference between the pre-service teachers' motivation averages ( $\bar{X} : 3,730$ ) and their teachers' averages ( $\bar{X} : 3,686$ ). Based on the results of the analysis, it can be said that both students and teachers have high motivation to use mobile education applications, but there is no significant difference between the groups.

### Conclusion

This research is intended to measure prospective teachers' and teachers' attitudes toward mobile education applications. In this study, which was prepared in the descriptive research pattern with the quantitative research method regarding the attitudes of teacher candidates and teachers towards mobile education applications, striking findings were obtained regarding the attitudes of teacher candidates. It has been observed that prospective teachers and teachers are the most popular technology of today, their positive attitude towards mobile devices and their use in all areas of their lives have a positive effect on their attitudes towards mobile education applications (Eryılmaz, 2013).

The positive attitude of pre-service teachers and teachers towards mobile education devices; also suggests that it is positive against new training applications to be used in these devices. "Mobile technologies support individual and collaborative learning thanks to their rapidly developing applications and easy network access, allowing individuals to research, share and access information at any time. The use of new technologies and software in education creates new learning opportunities for students and teachers. This increases the importance of individuals being open to using new technologies and accepting these technologies." (Menzi, Önal, Çalışkan, 2012, p 14). In this study, it was revealed that teacher candidates and teachers' attitudes towards mobile learning are positive, but this attitude does not differ in terms of other variables in a way to support the studies in the literature.

Nevertheless, it will increase and increase the success of the mobile devices, which can be very effective in making positive changes in the behaviour of the individual, which is the main purpose of education, and which can eliminate the limits and limitations in terms of time and place, and therefore the educational applications to be installed on these devices, which is the ultimate goal of teachers, in preparing students for real life. In addition, eliminating the limitations in student-centred mobile education and accessing the necessary data through mobile education applications will positively affect the equal opportunities in education. Another situation that will gain much more importance in the future than it is today - technology and technology products will never replace teachers, but it is possible to say that teachers using technology products will have a great advantage over teachers who do not use them and will be much more successful than teachers who do not use technology. Based on this prediction and academic studies, it is very important to include courses and practices such as technology and mobile learning in the curricula of education faculties.

In this study, it is seen that the attitudes of pre-service teachers and teachers towards mobile education applications are generally positive and in addition, when the sub-dimensions of "usefulness" and "satisfaction" are examined. The reason for this is thought to be the discrepancies arising from the fact that the curricula are not yet configured for mobile devices. In the study of Menzi, Önal and Çalışkan (2012), academicians stated that there are some limitations for the active use of mobile devices in learning activities. One of these limitations is that the devices are economically expensive, and consequently, institutions do not support mobile learning. The high cost of the devices and the low performance of the devices bought at affordable prices are among the common opinions expressed. There are also difficulties in accessing technical support and infrastructure (hardware-software incompatibility, lack of information). In the studies of Gündüz, Aydemir and Işık (2011) on 3G mobile learning environments, faculty members present a free learning environment independent of time and space, it is an interesting, motivating, facilitating and accelerating access to information, as well as limitations in infrastructure and trained human power. They stated that.

As a result, the attitudes of teachers and prospective teachers towards mobile education devices are positive in this research, which aims to determine what opinions of teachers and prospective teachers about mobile education practices and whether the difference between these views is meaningful. The fact that the difference between these views is not significant is similar in the literature. These results suggest that attitudes towards new education applications to be used on mobile devices are also positive. Mobile technologies support individual and collaborative learning thanks to their rapidly developing applications and easy network access, allowing individuals to research, share information and access information at any time. The use of new technologies and software in education creates new learning opportunities for students and teachers. This explains the importance of individuals being open to using new technologies and accepting these technologies.

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## Effect of Tinkercad on Students' Computational Thinking Skills and Perceptions: A Case of Ankara Province

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### ABSTRACT

This study was conducted to determine the effect of Tinkercad use in computer programming education on students' computational thinking skills and perceptions. In this context, 583 secondary school students studying in Ankara province of Turkey at the fifth, sixth, seventh and eighth grade level in the 2019-2020 academic year constitute the sample of the research. The research was carried out using an enriched pattern, one of the mixed research methods in which quantitative and qualitative research designs were used together. Research data were collected using Personal Information Form, Student Perception Questionnaire about Tinkercad Software and Information Processing Thinking Scale (For Secondary School Level). The data obtained were analyzed using the SPSS 25 program. Using the results of normality analysis, Mann Whitney U test and Kruskal Wallis H test were used among non-parametric tests. In addition, Tamhane's T2 and LSD tests from Post Hoc analyzes and Spearman correlation test from correlation tests were used. When looking at students' perceptions of Tinkercad, it was determined that they were highly motivated for interest and appreciation and found Tinkercad to be generally useful and easy to use according to research findings. It was determined that the students' perception of computational thinking was moderate. It was found that there was a positive low-level relationship between the frequency of Tinkercad use of students and their perception of Tinkercad, while there was a positive moderate-level relationship between their perception of Tinkercad and their computational thinking skills. In addition, it has been determined that the frequency of students' use of Tinkercad is affected by internal and external reasons, so recommendations for parents and programmers are included.

**Keywords:** 3D Design, Computational Thinking, Programming, Tinkercad

### INTRODUCTION

The perspective of technology has changed with the expansion of the opportunities offered to us by technological developments. Steps are being taken towards the transformation of the new generation from being individuals who only use technology, to becoming individuals who produce with technology. This process has accelerated with the introduction of 3-D printing technologies into our lives. Instead of being a user of many objects that we use in everyday life, research is being conducted on the way to becoming the manufacturer of these objects.

Designing new objects emerges as a new necessity, considering the ever-changing human needs. The fact that individuals cannot find the products that are suitable for the features they envision in their imaginations in industrial products made in uniform form and the high costs of specially made or built objects show us the need for 3D Design and Printing technologies. But the fact that some 3D design and printing devices are quite expensive prevents them from being bought or used by all segments of society. In this case, online tools are applied using the facilities provided by technology. Programs such as Tinkercad, 3Dtin, ShapeSmith, Cubify, and Autodesk 123D design are examples of the online tools used (Canessa, Fonda & Zennaro, 2013).

Tinkercad allows students to gain 3D design skills through ready-made projects or through students' own designs. The fact that the program is a web-based program, meaning that it does not require installation, is seen as a great way to teach 3D design to students (Avila & Bailey, 2016). Instead of purchasing the objects they need in daily life problems, the students can design and produce them in 3D using Tinkercad.

Computers, which affect us in all aspects of our lives in the 21st Century, present the concept of “computational thinking” as an important skill in searching for solutions to problems. According to Wing (2006), computational thinking is a skill that everyone should learn and this skill is defined and explained by many researchers (Aho,

2012; Barr & Stephenson, 2011; Bundy, 2007; Csizmadia et al., 2015; Czerkowski, 2013; Dede, Mishra & Voogt, 2013; Denning, 2009, 2017; Hemmendinger, 2010; Hu, 2011; Kafai, 2016; Lee et al., 2011; Leon, Gonzalez, Hartevelde & Robles, 2017; Lu & Fletcher, 2009; Selby & Woollard, 2014; Wing, 2014; Yadav et al., 2014; Tedre & Denning, 2016).

Computational thinking skill being a skill associated with other thinking skills such as mathematics, engineering, design, system, criticism, algorithm, creativity, spatial reasoning and mental rotation has been effective in making studies to integrate it into the educational environment in a wide curriculum from pre-school to graduate school (Citta et al., 2019; Giannakopoulos, 2012; Hershkovitz et al., 2019; Selby & Woollard, 2014; Shute et al., 2017; Shute, Masduki & Donmez, 2010; Sneider et al., 2014; Razzouk & Shute, 2012; Voskoglou & Buckley, 2012). For this reason, researchers have chosen to use various media and tools to improve students' computational thinking skills (Basawapatna et al., 2011; Bers et al., 2014; Brennan & Resnick, 2012; Chen et al., 2017; Howland & Good, 2015; Isnaini & Budiyanto, 2018; Israel et al., 2015; Kazimoglu et al., 2012; Morelli et al., 2011; Repenning, Webb & Ioannidou, 2010; Repenning, Basawapatna & Escherle, 2016; Roscoe & Fearn, 2014; Shute et al., 2017).

While Tinkercad allows students to make three-dimensional designs with its 3D Design menu, it also enables designs to be created with codes with the Circuit and Code Blocks menus. This leads to the idea that Tinkercad is a good tool that can affect all the sub-dimensions of computational thinking (creativity, algorithmic thinking, collaboration, critical thinking and problem solving). For example, it is thought that students' individual making 3D designs has an effect on the development of their creativity skills. It is thought that students' designing by forming groups has an effect on their development of collaboration and critical thinking skills, and that students' doing this process using code has an effect on their development of algorithmic thinking and problem solving skills. Lim and Kim (2019) determined that Tinkercad has a positive effect on the development of students' computational thinking ability.

It is known that programming is frequently used in teaching computational thinking (Shute et al., 2017). Repenning, Basawapatna, and Escherle (2016) stated that any programming tool can be used in the development of computational thinking. Various visual programming tools (Scratch, Alice, Code.org et al.) are used to facilitate the teaching of this skill (Bennett, Koh & Repenning, 2011; Brennan & Resnick, 2012; Israel et al., 2019).

In this context, the effective and efficient use of Tinkercad, which is used in design education in order to ensure that students in our country are with individuals who produce with technology, will be through determining students' perceptions of Tinkercad. In addition, determining the impact of Tinkercad on the development of students' computational thinking skills is important for whether the program is used for educational purposes.

### **The Purpose of Research**

This research was conducted to determine the students' perception of computational thinking skills and Tinkercad design training using Tinkercad. In this context, answers to the research questions mentioned below were sought:

1. What are the technological competence levels of the students?
2. What are the students' past experiences of online and web-based learning environments?
3. Research questions on students' perceptions of using Tinkercad software:
  - 3.1. What are the perceptions of students regarding the use of Tinkercad?
  - 3.2. Is there a significant difference in the use of Tinkercad in terms of motivation, usefulness and ease of use perceptions of students according to their gender?
  - 3.3. Is there a significant difference in the use of Tinkercad in terms of motivation, usefulness and ease of use perceptions of students according to their grade levels?
  - 3.4. What are the students' usage frequency of Tinkercad? What is the relationship between students' frequency of Tinkercad use and their perception of Tinkercad?
4. Research questions on computational thinking skills:
  - 4.1. What is the computational thinking skill of the students?
  - 4.2. Is there a significant difference between the computational thinking skills of the students according to their gender?
  - 4.3. Is there a significant difference between computational thinking skills of students according to their grade levels?
  - 4.4. Is there a significant relationship between students' Tinkercad usage perceptions and computational thinking skills?

## METHOD

This research was carried out using a pattern enriched from mixed research designs, in which quantitative and qualitative data collection methods were used together in terms of the process followed and its subject. In the quantitative dimension of the research pattern, descriptive scanning method was used from non-experimental research methods. In this way, students' perceptions and computational thinking skills related to Tinkercad software were tried to be determined. In the qualitative dimension of the research, the case study method was used.

### The Target Population and the Sample

The target population of this research is composed of secondary education institutions and private course centers affiliated to the Ministry of National Education in Keçiören, Yenimahalle, Mamak and Altındağ districts of Ankara province, which provide Tinkercad training to 5th, 6th, 7th and 8th grades in the 2019-2020 academic year. The sample of the research was carried out using purposeful sampling, which is a non-random sampling method. Purposeful sampling allows for in-depth research by selecting information rich cases depending on the purpose of the studies (Büyüköztürk et al., 2017, p.92). In this context, the sample group of the study was determined with the typical case sampling method, one of the purposeful sampling methods. The typical case sampling method requires determining a situation typical of many situations in the target population regarding the research problem and collecting information on this sample (Büyüköztürk et al., 2017, p.94). In determining the research sample, the private course Center, private school and public schools that provide Tinkercad training in their institutions were taken into account. Among these institutions, the private course Center and the private school provide Tinkercad training to their students in accordance with their own facilities. Public schools, on the other hand, provide Tinkercad training to their students within the framework of the facilities provided to their schools within the scope of the "IT production" project. For this reason, the sample of the study consists of 583 students studying in 5th, 6th, 7th and 8th grades in secondary school in the 2019-2020 academic year; 13 students in a private course center in Ankara's Keçiören district, 172 students studying at a public school in the same district, 74 students studying at a private school in Yenimahalle district, 55 students studying in a state school in Mamak district and 269 students studying in a public school in Altındağ district. The characteristics of these students are given in Table 1.

Table 1: Students' Characteristics

Grade	Gender				Total	
	Male		Female		N	%
	N	%	N	%		
5.	9	1.5	8	1.3	17	1.9
6.	135	23.1	137	23.4	272	46.6
7.	149	25.5	137	23.4	286	49.0
8.	5	0.8	3	0.5	8	1.3
Total	298	51.1	285	48.8	583	100

Of the total 583 students in Table 1, 298 students (51.1%) were male and 285 students (48.8%) were female. The reason for the small number of fifth and eighth grade students participating in the study is as follows: Eighth-grade students are not taught Tinkercad in public schools affiliated with the Ministry of education, these students received three weeks of training in a special course Center. Fifth grade students received 1 hour of training per week during a four-week special course by a private school affiliated to the Ministry of Education. Sixth and seventh grade students are given Tinkercad education within the scope of the "Production with Informatics" Project in public schools affiliated to the Ministry of Education. This training was carried out within the scope of Information Technology and Software course.

### Data Collection Tool

In this study, quantitative and qualitative methods were used to collect relevant data. It was decided to use three data collection tools within the scope of the study by examining the literature. These data collection tools are Personal Information Form, Computational Thinking Scale (for Secondary School Level), and Student Perception Questionnaire on "Tinkercad" Software.

The Personal Information Form consists of two option questions prepared to learn the gender and level of education of students. This form has been prepared for pre-determined research purposes.

The computational thinking scale (for secondary school level) is a scale used to measure students' computational thinking skills and the scale developed by Korkmaz et al. (2015) was used. The scale is a five-point Likert type

scale and consists of 22 items that can be grouped under five factors. The item discrimination powers of the scale were found to be between 3,818 and 23,287. Accordingly, it can be said that each item and each factor contained in the scale serve at a meaningful level the purpose of measuring the property that needs to be measured in general, and each item is distinctive at the desired level. Furthermore, the Cronbach alpha reliability coefficient of the scale was determined to be 0.809.

The Student Perception Questionnaire about "Tinkercad" Software was used to measure students' perception of programming with Tinkercad. This scale was adapted by Akçay (2009) from the scale developed by Turşak (2007) for the Small Basic programming tool, and its reliability coefficient was determined as 0.946. In addition, the scale was developed by referring to seven expert opinions for language and field assessment. The scale was adapted for Tinkercad within the scope of the research, and it was made appropriate by taking the expert opinion of an academic member. The scale includes quantitative and qualitative research questions and consists of a total of 40 items under 5 factors. The scale has 9 items aimed at measuring students' technological competence and 4 items aimed at learning about their past experience in online and web-based learning environments. There are 27 items about Tinkercad software aimed at students' perception of motivation, usefulness and ease of use.

### **Data Collection**

While collecting the research data, the students in Keçiören Private Youth Center were firstly applied the Pre-determined "Tinkercad" Software Student Perception Questionnaire and then Computational Thinking Scale (for Secondary School Level). These questionnaires were applied to students in a private school in Yenimahalle district of Ankara, a public school in Keçiören district, an imam hatip secondary school in Mamak district and a public school in Altındağ district, respectively.

### **Data Analysis**

The data obtained at the end of the study were analyzed using the SPSS 25 program in line with the predetermined study objectives. As part of the sub-objectives of the research, descriptive analysis was carried out primarily for quantitative data. Later, a normality analysis was performed to determine whether the tests were parametric. The results were analyzed by considering the kurtosis-skewness and variance coefficient, histogram graph, Detrended normality graph and Kolmogorov-Smirnov test from normality tests. In this context, non-parametric tests Mann Whitney U test and Kruskal Wallis H test were used. By checking the homogeneous distributions of groups, Tamhane's T2 test and LSD test were applied from post Hoc analysis methods to determine which group differed in favor. Spearman correlation test was used in correlation scales since the tests did not comply with the normal distribution. The qualitative data collected by using the Student Perception Questionnaire on the "Tinkercad" Software was analyzed using the content analysis method, one of the qualitative data analysis methods.

## **FINDINGS**

This section includes findings on students' technology usage competencies, past experiences in online and web-based learning environments, motivation for using Tinkercad, perceived usefulness, ease of use, and computational thinking skills.

### **Findings on Students' Level of Technology Competence**

According to the descriptive analysis results of students' technology use competencies (web browsers, search engines, e-mail, online forums & blogs, online messaging applications, Microsoft Office applications, programming language), it has been determined that students' technology use competencies are at the beginning level ( $\bar{X} = 2.62$ ).

When the findings of the students' past experiences about online and web-based learning environments were examined, it was determined that 70.8% of the students did not take any web-supported courses until today, and 79.6% did not take a web-supported programming language course. In addition, it was found that 96.7% of the students used the internet in their studies and 68.4% used a programming language.

### **Research Findings on Students' Perceptions of Tinkercad Software Usage**

In determining students' perceptions of Tinkercad usage, descriptive analysis was performed about the "Tinkercad" software by taking into account the motivation, usefulness and ease of use sub-dimensions of the student Perception Survey. Accordingly, the distribution of categories according to the motivational theme of the Tinkercad perception scale of students is shown in Table 2, the distribution of categories according to the usefulness theme is shown in Table 3, and the distribution of categories according to the ease of Use theme is shown in Table 4.

Table 2: Students' Perceptions of Motivation for Using Tinkercad

Motivation	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	$\bar{X}$	S
	%	%	%	%	%		
Interest / Enjoyment	4.3	13.7	27.3	35.5	19.2	3.82	1.00
Perceived Competence	7.7	9.4	22.5	35.0	24.9	3.60	1.18
Willingness	3.1	17.3	33.5	34.3	11.8	3.65	0.92
Participation	6.7	14.7	33.3	33.1	12.2	3.49	1.02
Average	5.45	13.7	29.1	34.4	17.0	3.68	0.83

When Table 2 is examined, it is seen that the items of interest and enjoyment in the motivation theme in the questionnaire have the highest average ( $\bar{X} = 3.82$ ). This can be interpreted as a sub-theme in which Tinkercad has the most influence. Participation-oriented substances were identified as substances that affect motivation at the lowest rate ( $\bar{X}=3.49$ ). This can be interpreted as a sub-theme in which Tinkercad has the most influence. Participation-oriented items were identified as items that affect motivation at the lowest rate ( $\bar{X}=3.49$ ).

Table 3: Usefulness Perceptions of Students Regarding the Use of Tinkercad

Usefulness	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	$\bar{X}$	S
	%	%	%	%	%		
Working More Effectively and Quickly	1.4	9.4	31.6	39.9	17.7	3.82	0.87
Job Performance	2.2	10.0	32.1	37.8	17.5	3.79	0.91
Increasing Productivity	7.5	9.8	25.9	32.4	24.0	3.55	1.17
Effectiveness	6.7	8.9	21.3	36.0	25.7	3.66	1.15
Makes Job Easier	6.0	10.3	19.7	32.2	31.4	3.72	1.18
Useful	6.9	13.2	29.9	34.9	15.1	3.56	1.05
Average	5.1	10.2	26.7	35.5	21.9	3.69	0.78

When Table 3 is examined, it is seen that the average score of the items related to the students' perception of usefulness of Tinkercad is  $\bar{X} = 3.69$ . Students' perceptions of "working more effectively and quickly," "job performance "and" makes job easier" seem to be above average. "Effectiveness", "Useful" and "Increasing Productivity" perceptions, on the other hand, show that although they are below the average, they are highly positive ( $\bar{X} = 3.66$ ,  $\bar{X} = 3.56$  and  $\bar{X} = 3.55$ ). In this case, it was determined that students generally found Tinkercad useful.

Table 4: Ease of Use Perceptions of Students on Using Tinkercad

Ease of Use	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	$\bar{X}$	S
	%	%	%	%	%		
Easy to Learn	4.1	12.9	28.6	34.2	20.2	3.71	1.01
Easy to Use	7.7	10.8	14.1	34.6	32.8	3.73	1.23
Easy to Become Skillful	5.8	15.1	29.2	28.8	20.9	3.43	1.14
Clear and Understandable	3.4	22.0	42.0	18.5	4.1	3.34	0.76
Average	5.2	15.2	28.4	29.0	19.5	3.44	0.70

When Table 4 is examined, it is seen that the average of students' perception of the ease of use of Tinkercad is  $\bar{X} = 3.44$ . It is seen that students' perception of "Easy to Learn" ( $\bar{X} = 3.71$ ) and "Easy to Use" ( $\bar{X} = 3.73$ ) towards Tinkercad software is above the average of ease of use ( $\bar{X} = 3.44$ ). However, students' perception of "Easy to Become Skillful" ( $\bar{X} = 3.43$ ) and "Clear and Understandable" ( $\bar{X} = 3.34$ ) were found to be positive, although they are below the general ease of use perception. In this case, Tinkercad software is easy to learn and use.

**Findings Regarding Students' Perceptions of Motivation, Usefulness and Ease of Use According to Their Gender**

The Mann Whitney U Test, one of the non-parametric tests, was used to determine whether there is a significant difference according to gender for the subthemes of motivation, usefulness, and ease of use of the Student Perception Questionnaire about Tinkercad Software.

Table 5: Comparison of Tinkercad Usage Perceptions by Gender

		Gender	N	Average Rank	Sum of Rank	U	z	P
Tinkercad Usage Perception	Motivation	Male	298	285,57	85099,50	40548,50	-,943	,345
		Female	285	298,72	85136,50			
	Usefulness	Male	298	283,53	84492,50	39941,50	-	1,243
		Female	285	300,85	85743,50			
	Ease of Use	Male	298	298,59	88980,50	40500,50	-,968	,333
		Female	285	285,11	81255,50			

\*  $p < .05$

When looking at Table 5, there were no significant differences in students' perceptions of motivation, usefulness and ease of use for Tinkercad use according to the gender (boys and girls) group ( $p > .05$ ).

**Findings Regarding Students' Perceptions of Motivation, Usefulness and Ease of Use by Class Levels**

Kruskal Wallis H test was applied to determine whether the students' perceptions of Tinkercad motivation, usefulness and ease of use differ significantly according to their grade levels.

Table 6: Comparison of Tinkercad Perceptions According to Class Levels

		Grade	N	Average Rank	Kruskal Wallis-H	P
Tinkercad Usage Perception	Motivation	5	17	416,35	14,901	,002
		6	272	301,07		
		7	286	273,92		
		8	8	365,69		
	Usefulness	5	17	409,88	14,635	,002
		6	272	300,03		
		7	286	274,66		
		8	8	388,56		
	Ease of Use	5	17	293,53	4,404	,221
		6	272	301,29		
		7	286	280,58		
		8	8	381,25		

As seen in Table 6 ( $p < 0.05$ ), there is a significant difference between students' motivation and usefulness perceptions according to their grade levels. Tamhane's T2 analysis from Post Hoc analysis methods was used to determine which group this difference was in. In addition, when looking at Table 6, it was found that the ease of use of Tinkercad did not differ significantly according to the students' class level ( $p > 0.05$ ).

Table 7: Perception of Motivation by Grade Level

(I) Grade	(J) Grade	Average difference (I-J)	Standard Error	P
5	6	,53257*	,15229	,014
	7	,66290*	,15265	,002

	8	,21471	,19461	,864
6	5	-,53257*	,15229	,014
	7	,13032	,07094	,339
	8	-,31787	,14001	,260
7	5	-,66290*	,15265	,002
	6	-,13032	,07094	,339
	8	-,44819	,14041	,062
8	5	-,21471	,19461	,864
	6	,31787	,14001	,260
	7	,44819	,14041	,062

When Table 7 is examined, it has been determined that the 5th grade level significantly differs according to the motivation perceptions of the 6th and 7th grades ( $p < 0.05$ ). Accordingly, Tinkercad software significantly affects 5th grade students' motivations.

Table 8: *Usefulness Perception by Grade Levels*

(I) grade	(J) grade	Average difference (I-J)	Standard Error	P
5	6	,46717	,16103	,054
	7	,57888*	,16169	,012
	8	,09150	,19808	,998
6	5	-,46717	,16103	,054
	7	,11171	,06680	,451
	8	-,37566	,13250	,111
7	5	-,57888*	,16169	,012
	6	-,11171	,06680	,451
	8	-,48737*	,13330	,030
8	5	-,09150	,19808	,998
	6	,37566	,13250	,111
	7	,48737*	,13330	,030

When Table 8 is examined, it is determined that Tinkercad usefulness perceptions differ significantly in the fifth grade level according to the sixth grade and the seventh grade and that they differ significantly in the 7th grade level according to the 8th grade ( $p < 0,05$ ).

### Research Findings on Tinkercad Usage Frequency of Students

Descriptive analysis was conducted to determine the approximate frequency of Tinkercad usage of students in computer lessons or during course training and outside of computer lesson or course training.

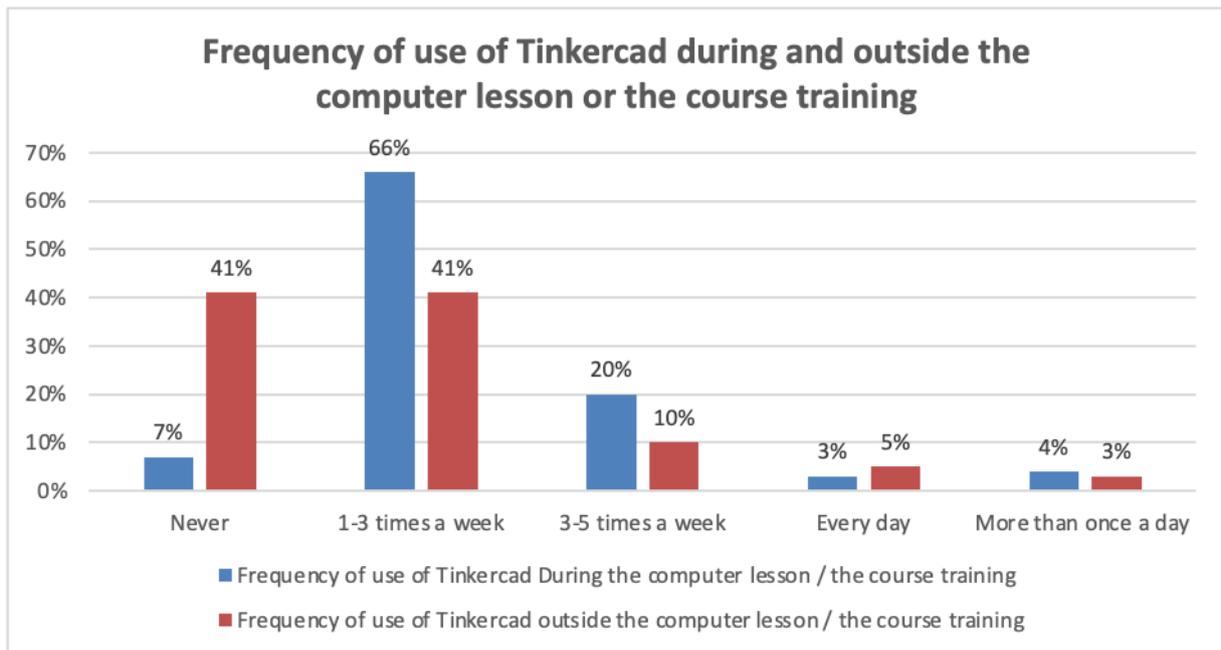


Figure 9. Students' Tinkercad Usage Frequency

When Figure 9 is examined, it was determined that 66% of the students used the Tinkercad "1-3 times a week" during the computer lesson or during the course training, and 41% of the students used the Tinkercad "1-3 times a week" outside the computer lesson or course training. About 40% (N=257) of the students who participated in the study responded to the cause of Tinkercad use frequency. When the answers given are examined, during training:

- Students who never used Tinkercad stated that they did not prefer to use Tinkercad in the education process because it was "unremarkable, uninterested, boring, incomprehensible, very difficult to learn, he/she was dealing with other lessons, he/she was listening only to the lecturer and preferring to learn from the book".
- Students who used Tinkercad 1-3 times a week stated that they prefer to "design and circuit, which they are interested in."
- It has been stated that students who used Tinkercad 3-5 times a week were interested in the program and that they used Tinkercad because it is fun, as well as effective in their homework or tasks given to the student.
- Students who use Tinkercad every day stated that they are interested in the program, the program is fun, they are curious about the program, and the program improves their imagination. One student stated that he used Tinkercad for 3D printing.
- Two of the students who used Tinkercad more than once a day stated that they used it to be more successful, as well as for the reasons mentioned above.

When the answers given beyond the training process are examined:

- Students who have never used Tinkercad have stated that their reasons were "due to the fact that they do not have a computer and do not find Tinkercad fun." Instead of dealing with Tinkercad, other students chose to play "games" on the computer, deal with "other lessons" and do their "homework", use "other applications" or not use them because they "don't need them". Four of the students stated that they did not use Tinkercad because it was "difficult" to learn.
- Students who used Tinkercad 1-3 times a week stated that they preferred Tinkercad because they "liked it very much", "wondered about it", "found it fun", and "liked it". Some students use Tinkercad to "improve themselves", "repeat what they do in class" and "do their homework". Some noted that they only use it for reasons that "they don't have a computer," "they can't log in from the phone," "a parental ban," and "they don't need it."
- Students who used Tinkercad 3-5 times a week stated that they used the program because they "liked it very much" and because it was "fun." Again, some of them stated that they used Tinkercad to do their homework.
- The students who use Tinkercad "Everyday" and "More than once a day" beyond their education period stated that they used Tinkercad as "very entertaining", "enjoyable", "nice program" and "easy".

### Findings Regarding the Relationship Between Students' Tinkercad Usage Frequency and Tinkercad Perceptions

In this context, Spearman test was used to determine the relationship between Tinkercad usage frequency and Tinkercad perception of students.

Table 9: Findings Regarding the Relationship Between Tinkercad Usage Frequency and Tinkercad Perceptions (TYHÖA-A)

Correlations			TYHÖA-A	
			Average	Usage Frequency Avg.
Spearman's rho	TYHÖA-A Average	Correlation Coefficient	1,000	,241**
		Sig. (2-tailed)	.	,000
		N	583	583
	Usage Frequency	Correlation Coefficient	,241**	1,000
		Sig. (2-tailed)	,000	.
		N	583	583

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Accordingly, when Table 9 is examined, it is seen that there is a relationship ( $r = ,241$ ) between the frequency of Tinkercad use of students and their perception of Tinkercad software. This relationship is positive. However, it is stated that if this value is greater than 0.70, it shows a high level of relationship and if it is less than 30, it shows a low level of relationship. Therefore, it was determined that there was a positive low correlation between the frequency of Tinkercad use of students and their perception of Tinkercad.

### Findings On Students' Computational Thinking Skills

The reflection level of each factor in the Information Processing Thinking Scale (for Secondary School Level), which is used to determine the computational thinking skills of students, was scored from the most positive (5) to the most negative (1). Items scored "4" and "5" in the scale reflect positive / high skill characteristics, items "1" and "2" reflect negative / low skill characteristics. (Güler, 2019).

Table 10: Students' Computational Thinking Skill Levels

Variable	N	$\bar{X}$	S	Levels					
				Low		Intermediate		High	
				F	%	F	%	F	%
Creativity		3.82	0.98	90	15.4	159	27,3	334	57.3
Algorithmic Thinking		3.44	0.98	148	25.4	224	38.4	211	36.2
Collaboration		3.74	1.08	114	19.6	155	26.5	314	53.9
Critical Thinking	583	3.51	0.98	147	25.2	206	35.3	230	39.5
Problem Solving		3.37	1.05	166	28.5	221	37.9	196	33.6
Total		3.56	0.66	107	18.4	315	54	161	27.6

When Table 10 is examined, the students' computational thinking skill average is  $\bar{X} = 3.56$ . It was determined that the students have intermediate level computational thinking skills. When the averages of the other themes of the scale are examined, it is seen that the highest average score is related to "creativity ( $\bar{X} = 3.82$ )" and "collaboration ( $\bar{X} = 3.74$ )" skills. At the lowest skill level, there are "problem solving ( $\bar{X} = 3.37$ )" and "algorithmic thinking ( $\bar{X} = 3.44$ )" skills.

### Findings for Comparing Computational Thinking Skills of Students According to Their Gender

Mann Whitney U test was applied to determine whether there is a significant difference between the computational thinking perceptions of the students according to their gender.

Table 11: Comparison of Students' Computational Thinking Skills by Gender

Gender	N	Average Rank	Total Rank	U	Z	P
Male	298	281,17	83790,00	39239,00	-1,587	,112
Female	285	303,32	86446,00			

\*  $p < .05$

When Table 11 is examined, it is seen that there is no significant difference ( $p > 0.05$ ) between the computational thinking skills of the students participating in the study.

**Findings for Comparing Computational Thinking Skills of Students According to their Grade Levels**

Kruskal Wallis H test was conducted to determine whether there is a significant difference between the computational thinking skills of the students according to their grade levels.

Table 12: Computational Thinking Kruskal Wallis Test Results by Grade Levels

Grade	N	Average Rank	Kruskal Wallis-H	P
5	17	367,76	8,050	,045
6	272	296,72		
7	286	280,14		
8	8	394,69		

When Table 12 is examined, it is found that there is a significant difference ( $p < 0.05$ ) in computational thinking skills according to the grade levels of the students. LSD analysis from Post Hoc analysis was conducted to determine which group favored this difference.

Table 13: Comparison of Computational Thinking Skill According to Grade Level

(I) Grade	(J) Grade	Average Difference (I-J)	Std. Error	P
5	6	,27266	,16495	,099
	7	,34033*	,16472	,039
	8	-,08316	,28289	,769
6	5	-,27266	,16495	,099
	7	,06766	,05588	,226
	8	-,35582	,23668	,133
7	5	-,34033*	,16472	,039
	6	-,06766	,05588	,226
	8	-,42349	,23652	,074
8	5	,08316	,28289	,769
	6	,35582	,23668	,133
	7	,42349	,23652	,074

In Table 13, it was determined that the computational thinking skills of fifth grades differ significantly compared to seventh grades.

**Findings On The Relationship Between Students ' Perceptions Of Tinkercad Use And Their Computational Thinking Skills**

Spearman correlation test was conducted to determine the relationship between Tinkercad usage perceptions of students and their computational thinking skills.

Table 14: Findings Regarding the Relationship Between TYHÖA-A and Computational Thinking Skills Correlations

		TYHÖA-A Average	Average Frequency of Use
Spearman's rho TYHÖA-A Average	Correlation Coefficient	1,000	,405**
	Sig. (2-tailed)	.	,000
	N	583	583
Computational Thinking Average	Correlation Coefficient	,405**	1,000
	TestSig. (2-tailed)	,000	.
	N	583	583

\*\* . Correlation is significant at the 0.01 level (2-tailed).

When Table 14 is examined, it is seen that there is a relationship ( $r = ,405$ ) between students' general perception

of Tinkercad software and their perceptions of computational thinking skills. Therefore, it can be said that there is a medium-level positive relationship between students' perceptions of Tinkercad software and their computational thinking skills.

## RESULT AND DISCUSSION

According to the results obtained for the students' perception of motivation, usefulness and ease of use of Tinkercad, it was determined that the students' perception of motivation when using Tinkercad was generally positive. In addition, it is seen that the items for interest and appreciation in the motivational theme have the highest average ( $\bar{X} = 3.82$ ). This situation also affects the frequency of students' use of Tinkercad during and beyond the computer lesson or course training ( $r=,241$ ). That is to say, students who are more interested in Tinkercad spend more time on the program than others during or outside of education. In addition, it affects the frequency of Tinkercad usage in the homework given to the student. However, it is observed that external reasons such as lack of computer or internet in students' homes, parental restriction, and internal reasons such as lack of interest in Tinkercad negatively affect the frequency of Tinkercad use outside of computer or course education. In addition, it was determined that students perceive Tinkercad as a useful and easy-to-use software in general.

It seems that there is a moderate positive directional relationship ( $r=,405$ ) between students' perceptions of Tinkercad software and their computational thinking skills. It was determined that students have intermediate level ( $\bar{X} = 3.56$ ) computational thinking skills. Looking at the averages of the other themes of the scale, it is seen that the highest average score is related to "creativity ( $\bar{X} = 3.82$ )" and "collaboration ( $\bar{X} = 3.74$ )" skills. "Problem solving ( $\bar{X} = 3.37$ )" and "algorithmic thinking ( $\bar{X} = 3.44$ )" skills constitute the lowest skill level.

Creativity is closely related to computer science and plays a central role in developing motivation and interest in this field (Hershkovitz et al., 2019). Teachers' freeing students while designing can be interpreted as influencing the development of creativity skills of students who are interested in 3D design. Miller et al. (2013) found that adding creative thinking activities to a computer science course increased the learning of computer-related knowledge and skills. Moreover, it is thought that the activities carried out by forming groups within the scope of the project studies are also effective in the development of the collaboration skills of the students. However, the reason for the low problem solving and algorithmic thinking skills of the students can be given as an example of the students not doing enough design work with codes by using the circuit and code blocks menus. According to Selby and Woollard (2014), the concept of algorithms is key to computational thinking. Erdem (2018) and Sirakaya (2019) determined that programming education is effective in the development of students' problem solving and algorithmic thinking skills. The fact that students did not do design work using Tinkercad's menus of circuits and code blocks can be interpreted as causing students to have low skills in the lower dimensions of computational thinking and algorithmic thinking.

Taşçı, Avcı, Yücel and Yalçınalp (2015) concluded that Tinkercad may be preferred due to its features such as ease of use, easy accessibility and free of charge in order to facilitate students' learning in courses with abstract concepts such as mathematics, physics. In addition, it contributes to the development of students' ability to create a whole relationship with parts and design (Çetin, Berikan and Yüksel (2019). It has been determined that this program affects spatial visualization and mental rotation skills, where students can see the shape in detail by looking at a shape from different angles, think in 3 dimensions, and translate the new shape in the mind, which will be formed by combining multiple shapes (Dere, 2017). However, a study emphasized that students use Tinkercad for communication and entertainment purposes and do not realize its production potential, so activities that allow students to produce should be prepared (Özdemir, Çetin, Çelik, Berikan and Yüksel, 2017).

When the international literature is examined, it is seen that Tinkercad has different uses in different areas. Cherry (2016) taught students how to design three-dimensional characters through Tinkercad to be used in short film animation. Kuo, Laiy, and Kao (2018), on the other hand, enabled students to create their own desserts by printing out the dessert designs they designed in Tinkercad using 3D Food printers. Madar, Goldberg and Lam (2018) aimed to combine the connection between computer science, Virtual Reality (VR) and 3D printing with C3d.io, a special tool they developed. This tool enables students to see the designs they make in Tinkercad (such as home design) as a prototype by transferring them to the virtual reality environment, and allows them to share the latest developed version with their peers via the web environment. Ng (2017) used the effect of 3D CAD and 3D printing to make it easier for students to learn solid volume in mathematics class. Díaz, Hernández, Ortiz, and Lugo (2019) introduced Tinkercad's Codebloks to students studying in different undergraduate programs in a summer course. In the study, they stated that the students who previously thought that the codeblocks were difficult liked the tool very much after using the tool. However, the fact that the tool is new and has a limited scope of application (3D modeling only) causes insufficient information on its use. In their study, M. Vera, Vera,

Vásquez, and Panéz (2018) used TinkerCad to simulate the connection of a bell, proximity or other components such as bluetooth, led and other Arduino board and resistor to introduce how to manipulate and program electronic components. The results obtained in the study conducted by Silva, Malebran and Pereira (2019) using Scratch and Tinkercad to improve the programming and Arduino-based computational-electronics competencies of a group of primary school children in Valparaiso-Chile showed that these tools can effectively improve children's programming and computational-electronic theoretical and practical skills.

As a result, it has been found that using Tinkercad in 3D design education increases students' motivation for the lesson, and Tinkercad is perceived as an easy and convenient program to use. In addition, Tinkercad has a significant impact on the development of students' computational thinking skills.

## RECOMMENDATIONS

In this study, recommendations for parents and programmers were included. Recommendations for parents stated that some of the students were unable to use Tinkercad at home (outside of school or course) due to parents' restrictions on internet or computer use.

For this reason, parents should do so in a way that does not interfere with their education and development while restricting their children's use of the internet or computers. They should support their education by taking the necessary measures to ensure that their children use the internet safely.

Suggestions for software developers: The fact that the program is not used offline makes it necessary for students who do not have a computer or have internet problems to study only within the scope of Information Technologies and Software course. Considering the duration of the Information Technologies and Software course and the problems of the classroom environment, this situation prevents students from receiving an efficient education. Therefore, the program needs to be developed so that it can work offline or on other platforms (smartphones).

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## Game Development on Unity

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### Abstract

In this paper we present the result of our work on implementation of an interactive environment that can be used to develop adaptive games with animating characters. The environment is designed to run in design and run mode, whereas certain design mode characteristics are still applicable in run mode so that the player can enhance the game and keep the features for future playing sessions. In design mode, the designer, can create a whole new world with animating characters, define rules using a predefined syntax to set certain features, restrictions and conditions. The designer can run the game in simulation mode, visualize the results, make corrections, package and deploy the game when satisfied with no need to write even a single line of code.

The approach presented here provides much more flexibility comparing with static games fixed at compile time. Interactive development environment with combination of modifiability gives the player the power to let the game be evolved in time without waiting the game developers to deploy a new version. Additionally, this flexibility reduces the stress on the game vendors arises from dealing with high and varying expectations of players within a limited time and development resources. Finally, the environment can be used to design special purpose games for teaching, healing, or any other gamification case study.

**Keywords:** Game development

### Introduction

The game players would like to be able to make small enhancements in the games they play. As the games are fixed at the time of deployment, it is quite difficult to collect and add such enhancement requests to the games. Usually, this can only be done with a new release which takes time and resources. By adding the ability to make such enhancements to the running games, the whole process of small enhancement request is simplified and optimized. Additionally, adding dynamically maintainable rules to the game, makes the game development more convenient and flexible. This can increase the speed of special purpose game development and reduce the coding effort enhancing the game design process. We named this game “Rule the World (RTW)”.

The aim of the study is to develop an interactive environment to develop games with animation characters. The designer will be able to define new animation characters, set certain characteristics, restrictions and conditions using a rule definition syntax. The rules will be interpreted and executed on the fly. So, the designer can set the animation to perform according to the rules, run in simulation mode and visualize the possible enhancement options. These rules are stored in a rule-base to let the user be able to make changes as necessary.

The aim is to implement an interactive environment to design adaptive game environment, define rules to interact with game objects, visualize the effect running in simulation mode and make corrections. Basically, two types of execution options are realized, the first one is design mode and the second one play mode. In design mode certain abilities are possible including add or remove components, define a ruleset for users to interact with the game objects and characters. The designer can run the game in a simulation mode after setting up the rules. As the user modifies the rules, the system parses and interprets them on the fly and change the behavior of the game, so it is possible to realize the effect of such changes. This is quite easier and more straightforward for game designers in developing games comparing with the coding effort required in traditional approaches,

compilation and deployment needs, which in return requires additional programming competencies or specialized work force.

The developed system can be used to add new objects, change the environment, let the rules be independent from the source code and change them to be effective during the simulation of play mode and keep the changes for next play sessions. These features help for faster development game development, reducing the coding effort and let the special purpose games be easily created and evolved for future needs. So, teaching with gamification, curing diseases setting up exercises with playing games and similar needs can be easily satisfied.

### **Related Work**

This section contains information about other projects and articles that has been useful during the development of RTW. However, we haven't found a game with high similarity with our game. Instead we looked for simulation type of games and basic game development guides.

Computer games have always evolved toward increased technical complexity to give the players things they have never experienced before (Blow, 2004). RTW provides players a simulation where they create their own playing style. Each wave of games is attempting several technical feats that are mysterious and unproven (Blow, 2004). RTW is also an attempt to create a new playing style for simulation type of games. Thus, brings a new structure, new functions and a new approach for how to play the game. With this approach, a lot of new issues appeared. Gameplay planning, the ability of both designer and players and how to manage them.

We had a few similarities in concept, so we took game Rimworld as a reference which is a simulation game that is based on colony management (Sharma & Pal, 2015). In Rimworld you gather characters with different skills that affect their job and manage them in a way, so the colony gets bigger and bigger while defending against various scenarios. The things we inspired from this game are basic things such as their UI but also major things like individual character AI and its usage. In Rimworld, when a character gathers resources they carry it to a stockpile that is designated by the player and these gathered resources appear only if they are in a stockpile. We were inspired by this simple UI feature and used in our project. Rimworld characters mostly move automatically according to their job but the player can also assign them a one-time task so the character will prioritize it and finish it first before doing its normal job.

We wanted to have autonomous character movement in project for better aspect of a simulation game thus we used A\* search algorithm in our character movement and pathfinding algorithm. A\* algorithms is a graph search algorithm for finding path from characters initial position to given or searched object's position (Sharma & Pal, 2015). A\* algorithm prioritizes nodes close to goal and closest to starting point. If there is path exist between start and goal A\* guaranteed to find that path with effectively.  $g(n)$  represents the exact cost from starting point to any point  $n$ ,  $h(n)$  represents the estimated cost from point  $n$  to the destination.

$f(n)=g(n)+h(n)$  is the formulation of cost of general path to goal for A\* algorithm (Xiao & Hao, 2011).

Using Unity to develop a game for inexperienced developers is the most practical solution (Brett & Simons, 2017). Game engine itself is easy to understand and learn and there are a lot of projects going on with the engine. Which is community being there to find solutions and improve overall quality of engine. There are phases in game development which involves many skills and knowledge required to do so. Unity goes through these phases by supplying various components and features such as collision detections which require mathematical calculations on screen and images. Unity does this in the background and gives developers a better and easier interface to work with.

There are many different games in our age and time. Some of these games are developed on custom game engine and frameworks while someone them are is being developed with private game engines of big game companies. Either way accessing these game engines are easier said than done. Therefore, the Unity as a free game engine is one of the most known and used game engine and framework in the game development field. Our project's graphic rendering and code execution are all done in the Unity.

### **The Study**

This section explains the details of our game project, Rule the World.

Interpreter is a program to translate high-level language programs into low-level language that can be executed by computers statement by statement as each instruction is executed (Xiao & Xu, 2011). In this manner, the interpreter we designed for our problem is to translate human language to high-level programming language.

Interpreter implemented for this project, it is required to identify English writing rules and high-level programming language writing rules such as functional separator implemented as 'comma' character and functional parameters divided by 'white space' character. Their work is like our implementation, but differences are they implemented their program to understand C language symbols and it aims for High-level programming language to Low-level programming language translation. It is designed as it should be as close as possible to speaking language thus it will allow the player to give commands to character easily. There are many concepts taken consideration while implementing a custom object oriented interpreted language such as Advanced Generics Bounding (bind parameters by their methods or fields as well as their types), Properties (plug-gable reserved words), Meta (advanced reflection with system listeners), Default values for Method Parameters, Custom Lambda declaration (naming a combination of parameters and return type for ease of use), Methods declared as Objects (also declared as Lambdas) (Singh & Agrawal, 2018). In our project we implemented the part of Advanced generics bounding by separating functions with 'comma' character and separating function parameters by 'white space' character. We implemented our interpreter with C# language, and it does not have standalone features and only works as in game functionality.

The game separates users to two, Player and Designer. Designer is one the who puts objects like houses, trees or even characters in the world. Designer also writes rules to decide what Player can and cannot. Designer enters the basic operation(s) in a text box as a string. These operation(s) have equivalent functions to them. These operation(s) are divided with comma while function parameters divided with white space characters. Designer can define repetition giving a number before colon.

5 times : Find AppleTree , GatherObjects Apple and Log

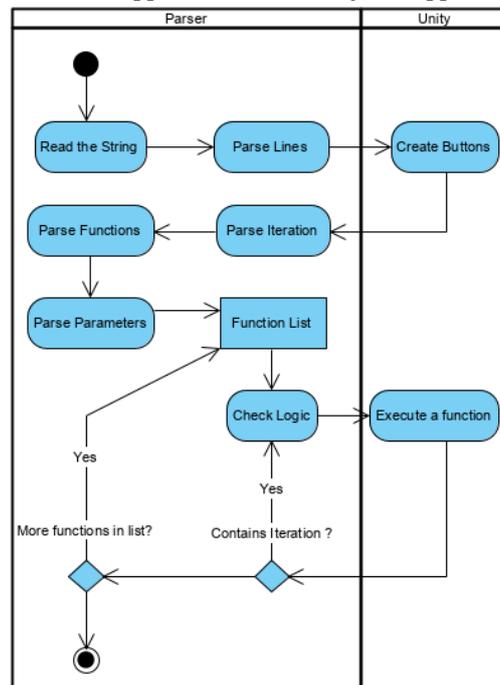


Figure 1: Example function to find apple tree and gather apples.

Activity diagram at [Figure 1] shows how this string will turn in to the rules that Player will be using. The divided function will be called and processed. Functions after parse operation saved on a list <string> are called one by one after completion with or without parameters depending on the parsing operation. Function may have a waiting condition such as walking until reaching the destination thus syntax should work accordingly. Each function finished in the list either stops the program or the user can input the repetition of the same rule until a new rule is set.

Regular Expressions library from C# is used for picking an expression from a text for parser and this way, the system works with string inputs from the user to command the characters. Commanding mainly works with a parser system, rule inputs are taken from the player as string. Application parse this string into methods and their parameters. Then starts to action in order. If needed, one waits for another to finish.

We included Aron Granberg’s pathfinding library which is a A\* pathfinding algorithm navigation mesh

generator to grant pathfinding to our characters in the game (Sharma & Pal, 2015), (Granberg, 2020), (Rimworld, 2020). With this library we generate mesh graphs for each new object created or removed from the game asynchronously and with efficient performance. Characters then move in the world according to this mesh, checking if there is an object in its path or is there even a possible path to the position. Another library package we included was TileMapExtras. With TileMapExtras you can make an automatic tile selection script which is used to select tiles according to their surrounding tiles. Meaning that you can say that while single water tile is surrounded by other tiles, other tiles must follow a certain rule we set in script and blend in with water so it would not look out of place. This makes world creation much easier.

In Unity, there is built-in methods for every script. They are named Start, Awake and Update. Start and Awake methods are used for initializing and setting certain objects and components on game objects, Start runs when object is created while Awake is executed when game is first executed. Update method is used for checking or updating variables on each frame game runs through. These methods are used throughout the project. For class system, we worked around a GameManager that controls the game flow, settings, and many other operations. Every character and object that are included in game and objects added to the game by users and ButtonHandler which is used for handling buttons are controlled by GameManager class.

Items and resources are kept in an Item Database System. Characters have their own inventories that are shown in the interface and those inventories are connected to Item Database. Time based actions like interaction timers, respawn timers etc. are handled with a Time Tick System. Generic insertion of object is defined as text files inside resources folder with specific texture files included. These text files are read by program to create button for designer to add these objects in world. Gameplay properties and configurations are set through to json file inside project folder with the name “config” text files. This file is read as a json object from program and set properties of built in objects and time scale of game. Game world is two dimensional and we need to give feeling of depth to players thus, we used the y value of position of game objects to define which game object is in front of each other. This is called as sorting order of objects. In example if y value of character is lower than y value of a tree game will show character in front of tree otherwise game will show character behind tree.

We implemented a configuration text file to save and restore general configuration of game such as tick count per second and built in object properties. This is done by creating a new class inside unity and setting its member variables as configuration variables. These class will be converted to json object and written to a text file inside project folder. If such configuration file exists in project files on next loading of game state it will be read from file and proper configuration object will be created and its properties will be used in game objects.

Objects can be placed and removed in designer mode. To make this work we check mouse position on each frame if it is on a deployable tile or not. This function will run on each frame and if function cannot be finished within frame it will be skipped. Game will be run at average 30 so there will be enough time to finish this function within a second. We hold information about the object is going to be placed inside game manager. When designer clicks on the button it will send object to game manager then tile will check if mouse over deployable tile and game object successfully send to game manager and object is created and deployed on mouse position by using left mouse button.

We used unity’s editor to have brush feature on world creation. This feature can only be used on development state so we create object which designer add from text files are created inside game world outside of player view on deactivate state. Each time designer places object it will be copied from this hidden object and its components will be set and configured.

### **Findings**

In implementation, the objects can be imported from external files, so the game world can be extended by such objects infinitely. It is possible to define how to interact with these objects. Additionally, the objects can be stored as characters in the inventory to make them active and let them behave and animate. The interactions and behavior of characters are defined using syntactically specified rules. Such rules can be quite complex depending on the need of the designer and player. A remarkable feature of our approach is that the rules can be parsed and executed on the fly to change the game in the run or simulation mode.

The toy project implemented in this study shows us that, the game development environments can be designed to provide more flexibility to the designers and players. This helps the designers to reflect their creativity to the games with no or limited coding effort. For the gamer point of view, this means shorter time of receiving new features to the games. Additionally, letting the rules be modified during the play mode and ability to save them for next time, the players themselves get the chance to make such enhancement to the game and even share them

to other players under copyright restrictions of the game vendors. These features can bring totally a new play development and evolution industry based on sharing and collective game development. Reducing the effort of code and making game development environment more efficient and flexible, can help specifically designed games, such as teaching by gamification and game based medical treatment to have more possibilities.

### Conclusions

In this study the aim was to show that a flexible game development environment can be implemented to create player's own world with dynamically manageable rules. We used "Rule the World (RTW)" environment as an example to show our approach to create adaptive and evolvable games are realizable.

The initial implementation is just a Proof of Work project with limited functions, simple rule syntax and minimum management options. Currently, characters in game has less than 10 functions but they can be combined with each other to create new rules, however, the possible number of functions can be radically increased to make it possible to define rich number of rules. In future, it is possible to other game types adding different objects and more complex and realistic rules. For the RTW environment, additional features such as day/night mode, user-tile map, chopping timers and animations can easily be added. However, additional to RTW, other game types can be implemented. The environment can be used in professional training options, education and any other situation that can be enhanced by adapting gamification.

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## Pre-Service Teachers' Views about Effective Use of the Whatsapp Application in Online Classrooms

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### ABSTRACT

This study applied a qualitative method to investigate Saudi students' perspectives on the effectiveness of using the WhatsApp application to support their learning and interaction in online courses. A purposive sample including eight Saudi pre-service teaching students (three males, five female) was selected from the College of Education at King Faisal University (KFU) in Saudi Arabia. These participants were interviewed face-to-face using a semi-structured interview technique. Member-checking and peer review strategies were used to check the trustworthiness of the findings. After the data was analyzed, two themes emerged: (1) the effectiveness of using the WhatsApp application and (2) the critical challenges involved in the usage of the WhatsApp application in an academic context. The effectiveness of using the WhatsApp application in this context includes (1) convenience and practice, (2) communication, (3) material sharing, (4) course information sharing, and (6) ease of use. The tendency for instructors to ignore student questions and a lack of interaction rules represent the critical challenges involved in the usage of WhatsApp in an educational context. Several recommendations were made based on the results of this study.

**KEYWORD:** Interaction, Qualitative method, Online group, King Faisal University (KFU), Saudi Arabia.

### INTRODUCTION

Online learning has grown in recent years, as many universities have adapted this method of learning (Almala, 2007). Some studies have indicated that interaction has an important effect on the success of online learning. Specifically, Dennen, Darabi, and Smith (2007); Fisher (2010); King (2014); Kiriakidis (2011); Kuo, Walker, Belland, and Schroder (2013); Picciano (2002); Redmond, Devine, and Bassoon (2014); Ustati and Hassan (2013); and Vonderwell (2003) have evidenced the significance of using various tools to foster continuous communication and interaction between students and instructors in an online learning environment.

In addition, some studies have revealed that the use of various synchronous and asynchronous tools to enhance interactions between students plays a key role in community creation, increasing learner satisfaction, and supporting creative thinking (Ally, 2004; Andresen, 2009; Christopher, Thomas, & Tallent-Runnels, 2004; Dixon, Dixon, & Siragusa, 2007; Dziorny, 2012; Gannon-Leary & Fontainha, 2007; Kruger, 2006; Lee, 2005; Ma & Yuen, 2011; Pena-Shaff, Altman, & Stephenson, 2005; Swan & Shih, 2005; AlYoussef, 2020).

Web 2.0 technologies have added a new dimension to online learning by providing opportunities for students and instructors to collaborate and interact both synchronically and asynchronously (Susilo, 2014). Social media represents an interactive form of Web 2.0 application. Facebook and Twitter are the most popular social media tools suggested by some studies to support student learning and interaction (Borau, Ullrich, Feng, & Shen, 2009; Bosch, 2009; Deng & Tavares, 2013; Friedman & Friedman, 2013; Hsu & Ching, 2012; AlYoussef, Alamri, & Al-Rahmi, 2020; Kabilan, Ahmad, & Abidin, 2010; Reinhardt, Ebner, Beham, & Costa, 2009; Shih, 2011; Pauschenwein & Sfirri, 2010; Wright, 2010). In addition, mobile learning applications, such as WhatsApp, have been suggested as tools that could potentially support student interaction and learning (Amry, 2014; Barhoumi, 2015; Nirgude & Naik, 2017; Rambe & Bere, 2013; Susilo, 2014).

### LITERATURE REVIEW

#### Social Media: Facebook and Twitter

The use of social media platforms, such as Facebook and Twitter, has been suggested by some studies as an effective tool to enhance student interaction and learning. Rutherford (2010) suggested that learners' social media use is positively related to their perception of their relationships with other learners and instructors and to their

self-reported learning experience quality. Friedman and Friedman (2013) suggested that social media use could effectively enrich several important skills, such as communication, collaboration, community, convergence, and creativity.

After conducting a qualitative study to investigate learners' use of Facebook at the University of Cape Town, Bosch (2009) indicated that using Facebook has some positive effect on the teaching and learning of developing educational micro-communities. Kabilan et al. (2010) surveyed 300 undergraduate students at Universiti Sains Malaysia to investigate students' views on the role of Facebook in supporting students' meaningful learning of the English language. The results showed that Facebook was capable of facilitating the learning of English and enhancing student motivation and confidence to communicate and write in English (Kabilan et al., 2010).

A mixed method study conducted by Shih (2011) showed that integrating peer assessment through Facebook into English learning could improve student motivation as well as students' English writing skills, knowledge, and cooperative learning. Deng and Tavares (2013) stated that students preferred Facebook over Moodle because "their interaction on Facebook was instant, spontaneous and organic, thus largely fostering their sense of community" (p. 174). However, Wang, Woo, Quek, Yang, and Liu (2012) suggested that although students were satisfied with the Facebook group as a learning management system, it had some limitations in terms of privacy concerns, file format, and organization of discussion threads. Madge, Wellens, and Hooley (2009) noted that although students sometimes utilize Facebook informally for learning purposes. Students also believe that Facebook is mostly useful for social purposes. DeSchryver, Mishra, Koehler, and Francis (2009) investigated the impact of using Facebook for discussions in an online course and found no differences between students using Facebook and students using Moodle.

Twitter is another popular social media platform that could be used to support learning and interaction in an online learning environment. Approximately 70% of the students that participated in a study by Borau et al. (2009) suggested that using Twitter makes it easier for them to communicate. Borau et al. (2009) showed that these participants believed the Twitter project improved their sense of community and allowed for better community development in their class.

Hsu and Ching (2012) applied a mixed method study to examine the effect of mobile microblogging, including Twitter, on learner participation in authentic learning in online courses. The students in this study properly used Twitter to critique examples; this helped them to apply and co-construct their knowledge. In addition, the participants in this study held positive views toward mobile microblogging activities.

In a study of Twitter use in conferences, Reinhardt et al. (2009) suggested that Twitter can improve the knowledge and communication of various online audiences. Pauschenwein and Sfiru (2010) revealed that using Twitter for the purpose of informal exchange "contributed to the motivation of learners during their participation in the online course. The participants extended their relatedness within the group, reflected their personal growth and supported others via acknowledging their inputs in a certain extent" (p. 22).

In a case study, Wright (2010) investigated the use of Twitter to improve the self-reflection of education students during a teaching practicum. The participants in this study regularly used Twitter to share their thoughts regarding their teaching practices. The results showed that these participants appreciated the role of constant contact with others in improving their interaction and sense of community.

### **Mobile Instant Messaging (MIM): WhatsApp**

Mobile instant messaging (MIM) is a widely used communications tool that works through the Internet and allows people to interact and chat in real time (Dourando, Parker, & de la Harpe, 2007). Sharples and Vavoula (2010) suggested that MIM provides an opportunity to create contextual, unbounded communities and establish conversations between students in both real and virtual environments.

"WhatsApp (from the English phrase 'What's up?', meaning 'What's new?') is an instant messaging application for smartphones. It allows users to exchange images, videos, and audio or written messages using their Internet connection" (Barhoumi, 2015, p. 222). WhatsApp has some advantages that could be beneficial to online learning. Barhoumi (2015, p. 222) summarized the benefits of WhatsApp in the context of blended learning as follows:

- The tool facilitates online discussions and collaboration from school or home in a blended mobile lecture.
- In a blended mobile lecture, online students can easily discuss different topics related to the course taught face-to-face in the classroom.
- The tool facilitates the creation of a class publication that students can edit and publish by engaging in collaborative and cooperative online activities related to the course taught in the classroom.
- It encourages students to insert text and messages to easily share information and knowledge related to the

course taught face-to-face in a blended mobile lecture.

- WhatsApp learning technologies can help students integrate videos, podcasts, messages, texts, images, and audio files in the blended mobile learning process.

Rambe and Bere (2013) reported that “WhatsApp’s anonymous, asynchronous collaborative learning allowed shy, less confident students to engage more productively” (p. 560). Furthermore, Rambe and Bere (2013) proposed that WhatsApp could help in fostering social constructivist environments, transferring the lecturer’s role from that of an instructor to that of a facilitator, and transferring student roles from those of information receivers to those of information generators, collaborators, information seekers/givers, and critical thinkers.

Nirgude and Naik (2017) noted that although WhatsApp could be an effective tool for flipped classrooms and student interaction via discussions, feedback, and information sharing, it has some limitations in terms of file size and Internet availability. In the same context, Susilo (2014) suggested that Facebook and WhatsApp groups could be used as online tutorial supplements because “they have pedagogical, social and technological affordances, which allow putting up announcements, sharing ideas and resources, and implementing online discussions” (p. 10).

In an experimental Saudi Arabian context, Amry (2014) found that using WhatsApp positively influenced the achievement and attitudes of female students. Amry (2014) also indicated that WhatsApp groups help students to interact, create learning communities, and share knowledge through instant messaging. In a similar experimental study, Barhoumi (2015) examined the effectiveness of using WhatsApp to support a blended learning course containing 70% face-to-face coursework and 30% WhatsApp discussions. The outcomes revealed that this blended learning course had a positive impact of using WhatsApp to support a blended learning course. In addition, the students in the experimental group showed positive attitudes toward blended learning.

Using a quasi-experimental method, Alsaleem (2013) studied the effects of WhatsApp electronic journaling on the vocabulary word choice and voice of undergraduate Saudi students’ writing. The findings showed that WhatsApp had a positive effect on the students’ writing skills, particularly on their voice and vocabulary word choice. Alshahrani and Al-Shehri (2012) emphasized that youth in Saudi Arabia have become more digitally savvy and increasingly connected via social media platforms, such as Twitter, Facebook, and WhatsApp. Therefore, university instructors should consider using such applications to reach students in teaching and learning processes.

However, the conclusions of a study by Alsurehi and Youbi (2014) revealed that although social networking applications are used widely by major universities in Saudi Arabia, their utilization seems to be limited to popular social media platforms, such as Facebook. This study also revealed that the use of social networking applications as collaboration and educational instruments seems to be limited by Saudi students. Alsurehi and Youbi (2014) noted that less popular applications, such as WhatsApp, are not broadly used or applied in Saudi Arabian universities. Alsaleem (2013) emphasized that while WhatsApp messages are widely used by undergraduate students, there are two different views regarding the effects of WhatsApp use on student learning. There is a need for more studies addressing the effects of using the WhatsApp application to support student interaction and learning in online courses. The present study was carried out to fill this gap by examining students’ views regarding the effects of WhatsApp use on learner interactions and learning in online courses.

## RESEARCH QUESTIONS

This study aimed to examine Saudi students’ perspectives on the effects of using the WhatsApp application to support their learning and interaction in online courses. To fulfill this purpose, this study investigated the following questions:

- How could the WhatsApp application be effective from a student viewpoint?
- What are the main problems raised by students with regard to the use of the WhatsApp application in an academic context?

## RESEARCH METHOD

A qualitative approach was used in this study to gain insight into how Saudi pre-service teaching students value the use of the WhatsApp application to support their learning and interaction in online courses. Using a phenomenological approach, this study sought to understand the advantages and problems involved in using the WhatsApp application in an academic context through the experiences of the students themselves. According to Patton (2002), phenomenological inquiry allows researchers to discover people’s experiences with regard to a particular situation (or phenomenon) and how they may interpret those experiences.

In order to obtain an in-depth understanding of the phenomenon, eight Saudi pre-service teaching students (three males, five female) were selected for this study using a purposive sampling technique. Purposive sampling

facilitates the selection of individuals who will allow the researcher to discover, understand, and gain insight into the central phenomenon of the study (Creswell, 2007; Patton, 2002). The participants were selected from the College of Education at King Faisal University (KFU) in Saudi Arabia. The researchers chose this sample because it was generally very well-educated. Further, these pre-service teaching students had knowledge and several skills relating to the use of social media technology, especially the WhatsApp application. To ensure confidentiality and anonymity, the participants were given pseudonyms. Further, all the participants were asked for their permission to have the interviews recorded.

Data were collected through audiotaped interviews with the participants. These interviews were conducted face-to-face with students of the College of Education at KFU and through WhatsApp recordings with the female students. Semi-structured interviews were used in this study. This technique was used mainly to answer the study questions and explore other related information that may have helped the researchers to meet the objectives of this study. All interviews were conducted in person and lasted for 14–18 minutes. The interview data were analyzed using interpretative phenomenological analysis (IPA). This technique allowed the researchers to find and understand the live experience of the studied situation (or phenomenon). Based on that, the researchers developed the emerging themes by coding data and studying the relationships between them.

Two key strategies were utilized to establish the trustworthiness of the findings of the present study. First, a member-checking technique was used to elucidate any areas of uncertainty in the data as well as any issues arising out of ongoing analysis. The second strategy was peer review. Both researchers analyzed the transcripts and then met to compare and discuss the initial notes assigned to the data and the emerging themes. This technique helps researchers to check the data analysis process and discover any issues that are missing in the data (Creswell, 2007; Patton, 2002).

## FINDINGS

The purpose of this study was to examine Saudi students' perspectives on the use of the WhatsApp application to support their learning and interaction in online courses. The findings of this research were grouped into two clusters: (1) the effectiveness of using the WhatsApp application and (2) the critical challenges involved in the use of the WhatsApp application in an academic context.

### **The effectiveness of using the WhatsApp application in an academic context.**

The findings presented in this section led to the identification of the most critical factors affecting the successful usage of the WhatsApp application in an academic context. The respondents stated that the most critical factors that should be addressed and taken into account in future plans concern (1) convenience and practicality, (2) communication, (3) material sharing, (4) course information sharing, and (6) ease of use.

#### *(1) Convenience and practicality*

Convenience and practicality were the main themes of this study. All the interviewees stated that they used the WhatsApp application because it is much more convenient and practical than university communication tools, such as e-mail. For example, Participant #3 shared that he joined the WhatsApp application group for one of his courses and stated that “using WhatsApp application in [his] class [was] more convenient and practical than using university’s email.” Another participant added that “students who WhatsApp application group could log into the group course at any time when they [were] available and get their answer from other students. It is better than email.” “One benefit of WhatsApp application is that you don’t have to worry about trying to find time to meet your classmate and ask them about assignment, exam, and deadline of homework.”

#### *(2) Communication*

Educational uses of the WhatsApp application for communication purposes include enabling communication among students and their instructors; facilitating class discussions; following announcements concerning classes, courses, departments, and schools; delivering homework and assignments; and providing resources and links related to course content. For example, Participant #1 shared that “using WhatsApp application in [their] class gave [them] the ability to communicate with [their] instructor easily.” Participant #5 added “[his] instructor created WhatsApp application group for [his] course to share with [him] any announcements about classes, such as rules about class, time and day about exam and assignment, final day of project.” Participant #6 found that “using WhatsApp application group in course is very important because students can discuss assignments with teacher or with classmate.”

#### *(3) Material sharing*

Educational uses of the WhatsApp application for resource and material sharing include activities such as exchanging multimedia resources and documents. All interviewees stated that they used the WhatsApp application

because it was the best way to share study materials, assignments, past examination papers, coursework results, and course timetables in the forms of documents and links. For example, Participant #1 reported “using WhatsApp application in [their] class to exchange course links and documents.” Participant #4 stated that they could “share video to the group for explaining difficult information.” Participant #7 stated that “through WhatsApp group, [they] requested [their] classmate to send the lecture material and examination papers they undertook... [their] classmate helped [them] through this application and [shared] all resource and material on one click and the same time.”

#### *(4) Course information sharing (collaboration)*

As the WhatsApp application contains different categorical groups and communities, it provides opportunities for students to join new group for collaborative learning. Students can exchange ideas, share information, and work together with others sharing common interests, ideas, and needs. Educational uses of the WhatsApp application for collaboration include allowing students to join academic groups related to their schools, departments, or classes and carrying out group works by sharing homework, projects, and ideas. Participant #1 expressed the idea that “through the work of groups (cooperative learning) in the distribution of tasks either as assignments or projects.” Participant #6 added that “there many of using WhatsApp application in classroom, including the exchange of important information in the subject lessons between students, sharing some important points are hidden by some students.” The students indicated that they used WhatsApp application to help each other. Participant #8 shared that they “save[d] time and effort in terms of meeting students in at the university and asking them to help... in assignments or exams.”

#### *(5) Ease of use*

Ease of use has been defined as “the degree to which a person believes that using a particular system would be free of effort” (Davis, 1989). In the present study, we defined the ease of use of the WhatsApp application as the ability to “easily and manage the overall system content without much effort.” All the interviewees stated that they used the WhatsApp application because it was easier to use than the university’s email. Participant #3 shared that “all Saudi students use the WhatsApp application in their daily time because it is easy to use.” Participant #5 stated that “currently, WhatsApp is the only application that brought together all students and faculties of the course in one place and time because it is easier than university’s email or online discussion board in learning management systems.” Further, Participant #1 stated that “the [WhatsApp] application has become very easy and not complicated to use in education.”

### **Critical challenges involved in the usage of the WhatsApp application in an academic context.**

The findings discussed in this section led to the identification of critical challenges involved in the usage of the WhatsApp application in an academic context. In the interviews, the respondents stated that these critical factors include (1) the tendency for instructors to ignore student questions and (2) a lack of group policies.

#### *(1) Ignoring student questions*

Interaction is an important factor in ensuring an effective learning environment. Many educators believe that this type of interaction is a very important component of the success of online educational programs. Interactions between learners and their instructors are intended to support the learners’ understanding of the material or clarify meanings. Such interactions can also help students to clarify vague points and reinforce correct interpretations of course information. All the interviewees reported that the tendency for instructors to ignore students’ questions in WhatsApp application groups was one of the most critical challenges involved in the usage of the WhatsApp application in an academic context. Participant #1 stated that “some faculty create WhatsApp group and ignore student questions” and wondered why this occurs. Participant #5 stated that “in online courses, faculty should be available to answer students’ questions and engage them to learn. In WhatsApp group, teachers may ignore the question/message sent by their students.” Participant #6 added that “[they lived] outside university campus” and that they “sometimes... [needed] the course teacher to answer special questions about the course. [They] used WhatsApp group rather than come to campus, but some teachers always [did] not always interact with [their] inquiries.”

#### *(2) Lack of group policies*

The purposes of WhatsApp application groups may not be achieved due to misuse by some students. The majority of the interviewees pointed out that some students posted irrelevant messages, which distracted their classmates’ attention. Participant #6 stated that “in course groups, some students do not take the subject seriously.” Further, Participant #3 shared that “a large number of posts distracted the learning process of students.” Participant #4 added that “some students add score of football game. This is not acceptable.”

## DISCUSSION

The participants in the present study appeared to consider WhatsApp as an effective application for the purpose of supporting cooperation and discussion among students and faculty members. Therefore, the WhatsApp application could play an effective role in promoting social and academic interaction both among students and between students and their professors. The results of this study also indicated that WhatsApp is a convenient, practical, and easy-to-use program. In addition, this application helps students to communicate, share various materials and information, and collaborate with each other. These results are consistent with those of previous studies (e.g., Rambe & Bere, 2013; Nirgude & Naik, 2017; Susilo, 2014; Amry, 2014; Barhoumi, 2015; Alsaleem, 2013; Alshahrani & Al-Shehri, 2012; Mazana, 2018; Alubthne, 2018).

WhatsApp remains at the forefront of social networking programs. This application is widely used, especially in educational and social contexts, although there are a number of applications and programs that possess the same advantages and services. The popularity of this program can be attributed to many reasons. For example, it was one of the first programs to emerge in this field. It is also very flexible, and continuous updates have improved upon its services. Nevertheless, there are some challenges and caveats that should be considered when using WhatsApp in an online learning environment.

As indicated by the outcomes of this study, the tendency for instructors to ignore students' questions in WhatsApp application groups is one of the most critical challenges facing the effective usage of WhatsApp. This problem limits the quality of teacher-student interaction, which is one of the most important factors of the success of online learning courses, as students in these courses cannot meet their instructors in person on a daily basis. A study by Kiriakidis (2011) showed the importance and effectiveness of interactions between students and their instructors in helping them to learn and acquire feedback. Kuo et al. (2013) indicated that learner-instructor interaction is a significant predictor of student satisfaction. Further, Ustati and Hassan (2013) pointed out that students require more two-way interactions with their instructors.

The outcomes of this study also indicated that some students misuse WhatsApp course groups due to the absence of rules regulating students' interactions. This problem distracts students' attention and negatively affects the quality of required academic interactions. Similar results were found in a study by Mazana (2018), in which the participants considered the misuse of WhatsApp groups to be one of the most critical challenges affecting students' interactions through WhatsApp. In order to avoid distractions and problems created by useless or irrelevant messages, instructors should impose some rules, including principles and foundations, that students should adhere to in WhatsApp groups to organize their interactions and determine the features of messages to be sent. Additionally, students should be informed in advance as to the methods and rules that they should follow when responding to their colleges or instructors. Students' interactions and adherence to predetermined rules should be monitored by their instructors or supervisors appointed by their instructors. Yamagata-Lynch (2014) indicated that "ground rules helped identify formal rules that students could then interpret as a guide to identify how to behave appropriately in course related activities in both the synchronous and asynchronous platforms" (p. 198).

## CONCLUSIONS

The findings of the present study suggest that WhatsApp is a practical, convenient, and easy-to-use application that is effective in enhancing interactions, discussions, collaboration, and communication both among students and between students and their instructors. WhatsApp can also allow students and instructors to share instructional materials and resources, ideas, and course-related news. Therefore, we recommend that instructors use WhatsApp to interact and communicate with students by creating groups and encouraging students to discuss and share ideas, resources, and appropriate educational sites.

Instructors should also monitor student interactions by supervising them and responding to their questions and inquiries in a timely fashion. Instructors can also use WhatsApp to post course-related announcements, follow up on group projects, and provide cooperative group feedback. Finally, instructors should consider setting rules to regulate group interactions. These rules should be included in course syllabi and posted in WhatsApp groups. Following up and monitoring, the students' commitment to these rules is necessary to keep group discussions and posts on the right path and achieve the goals for which these groups were created.

These tasks may impose an additional burden on already burdened instructors, especially in the context of online learning. Instructors of online courses must monitor student interactions, read student posts, watch posted material and resources, and answer many student questions. To reduce the burden on instructors, we recommend that instructors allocate some students to assistants. Student assistants can monitor students' compliance with group rules, supervise student posts, collect and organize student questions, and direct these questions to the instructor at a predetermined time so that the instructor can respond to student questions in a timely fashion.

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## Secondary School Mathematics Teacher Training in Austria

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### Abstract

After a brief overview of the Austrian education system, the teacher education system is reviewed in sections. The differences before and after 2015, when significant changes were enacted, is highlighted. Central to the pedagogical changes was the influence of Hans Werner Heymann.

**Keywords:** secondary school and mathematics

### Introduction

Austria is a middle-European country which borders on eight other countries: to the north are Germany and the Czech Republic; to the east are Hungary and Slovakia; to the south are Italy and Slovenia; to the west are Switzerland and Lichtenstein. Austria is a parliamentary federal republic with German as its official language. Slovenian is also an officially recognized language in the federal state of Carinthia as is Burgenland-Croatian in the federal state of Burgenland. The chancellor-led federal government exerts influence over all law-making matters. Certainly, however, the nine federal states of Burgenland, Carinthia, Lower Austria, Salzburg, Styria, Tyrol, Upper Austria, Vorarlberg, and the Austrian federal capital Vienna also exercise law-making functions and in certain areas have administrative primacy.



**Figure 1. Austria: Borders and federal states (Source: <https://de.wikipedia.org/wiki/Österreich>)**

### The Austrian School System

The Austrian school system is in essence composed of three parts. A primary level, the Austrian “Volksschule” after “Kindergarten” (or preschool with children from 3 to 5 years old), followed by the secondary levels I and II. While the primary level instructs pupils from ages six to ten years old, the secondary I level is attended by pupils between ten and fourteen years old. With the completion of the ninth schoolyear, compulsory education ends in Austria. In cases where students finish this ninth schoolyear in a polytechnical school, they often choose to begin a trade apprenticeship. For those pupils who complete their secondary I level in a higher-level general education school (“AHS”, “Gymnasium”), they can remain at this type of school. Other types of secondary-II-level schools which continue are, for example, those which focus on commercial fields, such as business or technical schools (e.g., “HTL”, “HAK”, “HLW”). Many of these secondary-level-II schools (“Gymnasien”, technical schools, etc.) end after the twelfth or thirteenth year of schooling with finishing exams (“Reifeprüfung” or “Matura” in Austria, “Abitur” in Germany). This gives graduates the right to attend a university or technical university (“Fachhochschule”). However, many university programs, e.g., medicine but also teacher preparation, will still require an entrance exam.

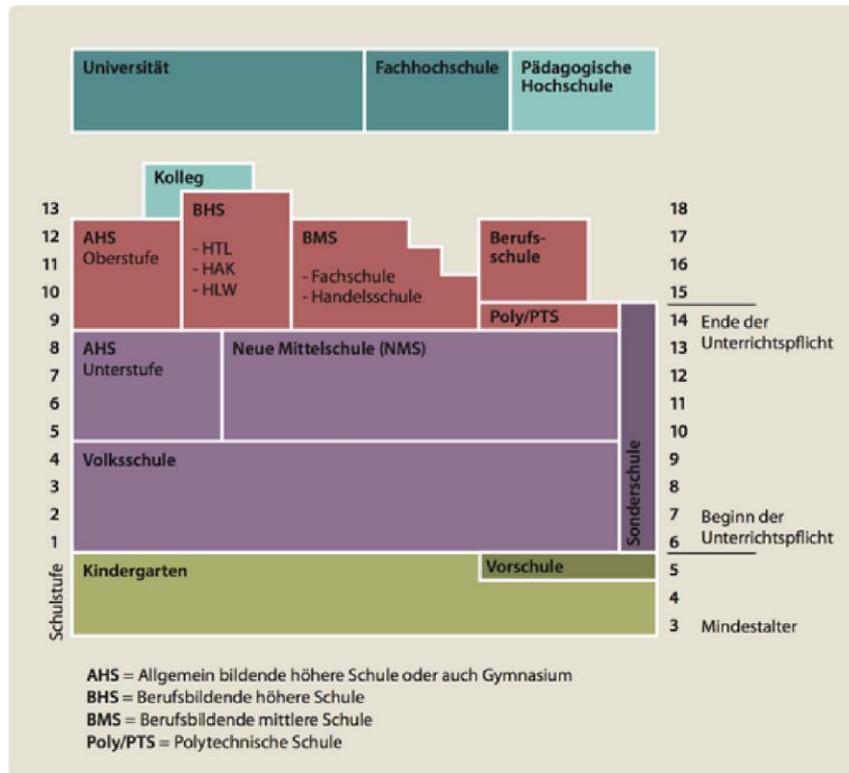


Figure 2. The Austrian school system (Source: <https://www.demokratiewebstatt.at>)

### Education for Secondary School Teachers through Approximately 2015

Teachers in Austria are educated at pedagogical universities of applied science, universities and also private universities. Whoever wants to teach at the primary level must attend a pedagogical university of applied science. Those who wish to teach at the secondary levels can undertake an appropriate course of study at either a university or pedagogical university of applied science. The primary level teaching degree qualifies one to teach at a “Volksschule”, while the successful completion of the secondary school teaching degree provides the possibility to teach general education subjects at a higher-level general-education school (“AHS”), a new middle school (“NMS”, formerly called “Hauptschule”), a special school, a polytechnical school (“PTS”), or a vocational middle or higher-level school (“BMHS”).

In its current version, the teaching-degree program is a twelve-semester two-tier Bachelor’s-Master’s program.

The Bachelor’s portion of the program encompasses eight semesters and includes 240 ECTS points<sup>1</sup>. At the end of the Bachelor’s portion of the program, a Bachelor’s thesis is required for each teaching subject – in Austria, two subject areas are typically studied – candidates have chosen as their areas of specialization. With this a Bachelor of Education (B.Ed.) degree is attained as well as the allowance to continue on with the Master’s program.

The Master’s program consists of four semesters and includes 120 ECTS points. The final component of the program is a Master’s thesis which focuses on a specific topic within one of the two areas of study. Alternatively, the thesis can deal with questions regarding educational science fundamentals. Graduates of the program, after successful Master’s exam results, attain a Master of Education (M.Ed.) degree.

Prior to ca. 2015, a multitude of tertiary educational institutions with limited connections to one another separately organized their own teacher education programs, whereas after this point universities and pedagogical universities of applied science formed a development network to cooperatively generate curricula and to jointly offer them. This was largely a result of political pressure from the Austrian Education Ministry.

<sup>1</sup> As a result of the Bologna Reform Process, ECTS (“European Credit Transfer and Accumulation System”) points were established to ensure the compatibility, transferability, and overall acknowledgement of academic achievement within the EU. Instead of continuing to calculate weekly semester hours (SWS), achievement points (credits or credit points) are awarded for successful course completion. The number of credit points (CP) varies depending upon effort necessary for the particular course. One credit point represents approximately 25 to 30 hours of work.

## Development Networks Since 2015 <sup>2</sup>

At the latest since 2015 and influenced to a degree by the geographical conditions which prevail in Austria, the tertiary educational institutions – that is, universities, colleges, and pedagogical universities of applied science – together began to establish a unified teacher education program adhering to the Bachelor’s-Master’s formula. Ultimately, four groups crystallized from this, each of which necessarily included at least one university since pedagogical universities of applied science (“PH” – “Pädagogische Hochschulen”) are legally prevented from offering Master’s programs. In alphabetical order, these are:

- “Verbund Mitte” (Middle group: Salzburg, Upper Austria – see Website 1);
- “Verbund Nord-Ost” (Northeastern group: Lower Austria, Vienna – see Website 2);
- “Verbund Süd-Ost” (Southeastern group: Burgenland, Carinthia, Styria – see Website 3);
- “Verbund West” (Western group: Tyrol, Vorarlberg – see Website 4).

How can we characterize these educational institutions which also compete with one another for students? One possibility exists in the cursory presentation of essential general sections of the curriculum, namely the competencies expressed there.

The groups maintain a generally similar style in the curriculum preambles. Concurrently, the competencies listing leads to the presumption that a distinctly pedagogical education theory provides the basis for the formulation of these competencies. This is demonstrated, for example, in areas which indicate reflection with a scientific basis or reflection on media usage, but also in areas which hint at the tension between subject and methodology. To be able to assess the possible source of this pedagogical connection, we use educational theory flash feedback.

The basis, especially for the mathematics-teaching curriculum described below, was, among other things, the book by Hans Werner Heymann *Allgemeinbildung und Mathematik (General Education and Mathematics)* (Heymann, 1996), which was heavily discussed in the beginning of the 2000s in German-speaking circles dealing with mathematics didactics. In his model Heymann introduces a catalog of 7 reasons why mathematics should be taught in secondary schools. Since this book was not published in Italian and it had significant influence on the development of the mathematics curriculum in Austria, at least that of the southeastern group, we want to present some of Heymann’s ideas.

Heymann gives “preparation for life” as the first reason for teaching mathematics (Heymann, 1996, pp. 51 ff.). However, the author argues less in terms of the saying “Non scholae sed vitae discimus”, rather he means that mathematics is a cultural technique, like reading and writing, which is a necessary prerequisite for coping with everyday life in our daily lives.

As a second reason, Heymann postulates that mathematics can provide cultural coherence (Heymann, 1996, pp. 65 ff.). For one thing, this means the assimilation of cultural assets, which were created in the past, so mathematics is viewed as an historical inheritance. Furthermore, this can also be viewed as the interdependence of societally relevant cultural segments demonstrating mathematics as a tool in other aspects of science.

An orientation to the world is his third reason (Heymann, 1996, pp. 79 ff.). Here teaching mathematics has the task to convey a general education to pupils. But here the focus is not practical application, as with the first reason as a means for “life preparation”, rather striving towards the development of a differentiated worldview).

With the fourth reason, the guide to critical thinking (Heymann, 1996, pp. 88 ff.), Heymann views teaching mathematics as a paradigmatic example of not only the application of science but also the ability to recognize its limits. The next reasons, the development of responsibility acceptance (Heymann, 1996, pp. 104 ff.), practice in communication and cooperation (Heymann, 1996, pp. 110 ff.), and the strengthening of the pupil-ego (Heymann, 1996, pp. 117 ff.), aim at the expansion of critical thinking as cognitive-intellectual capacity through the ethical principle of cooperation. The teaching culture of appropriately organized mathematics instruction can play an exemplary role by synthesizing individual thinking capabilities and social competencies.

Turning back to the curriculum, we concentrate on the general description of the subject mathematics in the Bachelor’s program while keeping Heymann’s first three reasons in view. These are a possible criterium for integration of the curriculum’s (see Website 5a, pp. 408 ff.) formulated catalog of competencies (in part or with certain examples). This catalog should formulate the competencies for future teachers and thereby implicitly mirror the expectations of a successful mathematics lesson: preparing for life (mathematics in practice), cultural coherence, world orientation.

<sup>2</sup> As the official regulations of the teaching program for mathematics, especially the corresponding curricula, are subject to constant adaptation, internet sources will be disproportionately used in the following text.

So much for our look at selected competencies for the Bachelor’s program. How did these demands affect both the mathematical as well as the subject didactical courses, provided these were formulated in a curriculum? The following tabular overview (Figure 3) illustrates the various course foci, their respective hour amounts, corresponding ECTS points, and the recommended semester in which the courses, which are combined into a module, should be completed.

Module overview Bachelor’s program	Semesters hours	ECTS	Semester
Elementary Mathematics 1	6	8	1, 2, 3
Analysis	15	20	1, 2
Linear Algebra und Analytical Geometry	13	18	3, 4
Fundamental subject-didactical questions of teaching math	5	5	4, 5, 6
Didactics of Geometry und Analysis	7	7	5, 6, 7
Stochastics	7	9,5	5, 6
Elementary Mathematics 2	4	5	6, 7
Didactics of Arithmetic, Algebra and Stochastics	7	8	5, 6, 7, 8
Application und Reflection	10	12,5	7, 8
Total	74	95	

**Figure 3. The Bachelor’s program**

The titles of the above module listing and their intended contents are essentially clear. Within the two Elementary Mathematics modules are the themes discrete mathematics, elementary number theory, and geometry. But what is the module Application and Reflection, which is recommended at the end of the program? This module consists of a series of courses whose content are, on the one hand, mathematically oriented and, on the other hand, are historical and epistemological questions regarding mathematics. The first includes lectures covering basic differential equations and applications of mathematics in a science-technology context. The graduates should thereby be prepared to teach mathematics in vocational schools. At the same time, the courses “History of Mathematics from Antiquity to the Modern Era” and “Philosophical and Epistemological Bases of Mathematics” belong to this module (Website 5a, p. 425). In accordance with Heymann’s claim that teaching mathematics also contributes to a general education, these two courses should bring students closer to the meaning of mathematics in the context of cultural history and the history of ideas.

### Practical Training

Looking at the total ECTS points for the mathematics teaching segment and adding the corresponding total for the second teaching subject, which future teachers also have to take, we come up with 190 ECTS points. Since the Bachelor’s program requires 240 ECTS points, the remaining ECTS points are split between two other segments of the teaching program. The first segment is the pedagogical training, and the second requires the students to complete a practical training. We will concentrate on this practical training. It consists of 20 ECTS points which, depending upon the conversion key, converts to a commitment of approximately 500 hours. The following table shows the recommended semester breakdown of this practical training requirement for the mathematics segment. Note here that the numbers in parentheses represent the other teaching-subject programs’ semester recommendations for their practical training. The commission which designed the mathematics teaching plan was convinced that completion of the practical training would only be relevant after the completion of particular mathematical and didactical courses. This practical training<sup>3</sup>, which must take place in secondary schools, is accompanied by a series of courses. These are both subject didactical and pedagogic in nature.

<sup>3</sup> The practical school training in this new Bachelor’s program differs significantly from the practical work experience of the former teacher program. Previously, as a rule, an internship in a school combined with subject didactical and various pedagogical courses would be completed in the fifth semester. After the completion of the teaching program, the graduates would be assigned to a school where they would complete their so-called teaching internship (probation year). Under the direction of two specially trained teachers from this school, they taught several classes. After the successful completion of this probation year, they were eligible to teach independently in the years thereafter.

Semester	Name	Parallel didactical course	Parallel pedagogical course
2	Internship Orientation	-	Teaching Theory and Practice
5 (4)	School Internship 1	Subject Didactics Course 1 (from the corresponding subject)	Introduction to Pedagogical Research
6 (5)	School Internship 2	Subject Didactics Course 2 (from the corresponding subject)	Diversity and Inclusion
7	Research Internship: Quality Assurance and Evaluation	-	Quality Assurance and Evaluation
8 (6)	School Internship 3	Subject Didactics Course 3 (from the corresponding subject)	Pedagogical Diagnostics, Support, and Performance Assessment

**Figure 4. School Work Experiences**

There are five practical training elements, of which only three have a corresponding subject didactics course. What are the goals of these practical trainings (Website 5a, p. 26)?

The internship orientation should make the transition from a pupil role to a teacher role possible through a change of perspective, but at the same time afford the opportunity to once again reconsider their choice of occupation. In School Internship 1, the students acquire coping skills for the topic's observation, questions, and investigation regarding the particular lessons. They will thereby be confronted for the first time with content of practical research. The content of School Internship 2 deals with the complex topic of diversity and heterogeneity in educational classroom processes, specifically how one designs lessons in heterogenous groups, how one organizes what happens in the classroom with focus on the interaction of existing socio-cultural and gender-specific differences. School Internship 3 focuses on lesson planning and implementation. Here students practice academic-level assessment, subject-didactical diagnostics, and performance evaluation. Concerning class management, the students concentrate on class leadership which enhances learning and prevents disruption.

In Research Internship, which is paired with only a single course, the students learn how to empirically support scientifically based practical research.

The multiplicity of internships, for one thing, mirrors the wish of lawmakers for a practical education, but this also faces a host of concerns. The first of these is the pragmatic necessity of organizing the course of study. School visits result in absence from one's own campus. Attending lectures, exercises, and seminars is made more difficult as students must also create their own schedules while paying attention to numerous additional constraints. A second possible concern is the difficulty in finding an adequate number of schools and qualified teachers who are prepared to support and instruct a large number of teacher candidates. As a third concern, it is questioned whether the students with so many internships during the course of their studies can learn to maintain an adequate distance as a teacher from the school and class itself when they are constantly confronted with the daily teaching routine. The future will show if, as a result of any of these stated concerns, school internships will be newly organized.

### The Master's Program

A 4-semester Master's program with 120 ECTS points is attached to the 8-semester Bachelor's program, as mentioned previously. According to current rules, graduates of the Bachelor's program who attain teaching jobs have the possibility to enter the Master's program while working. However, in the near future this will no longer be available. What form does this segment of the course of study have? Consider the following table (Figure 5):

Modules	Semester Hours	ECTS	Recommended Semester
Mathematics Deepening	7	10	1, 2
Mathematical Lessons as a Complex Process of Networking Between Teachers and Learners	3	5	2, 3
Teaching and Learning of Mathematics as a Subject Didactical Research Field <sup>4</sup>	3	5	3, 4
- Or -			
Scientific Deepening in the Subject and Subject Didactics	3	5	1, 2

Total	13	20	
Pedagogical-Practical Studies: Master Mathematics	2	10	1 , 2, 3, 4

**Figure 5. The Master’s program**

One recognizes from the assigned ECTS points that mathematics-specific and subject-didactical education are essentially evenly split. The mathematical deepening allows the student to choose from many different courses, mostly from the Bachelor’s program. As most of these will be standard courses, we will concentrate on the subject didactics and consider the module “Mathematics Lessons as a Complex Process of Networking Between Teachers and Learners” as an example. In the relevant courses, the students should be brought as closely as possible to the conduct of an ideal teacher. We understand the intended competencies from the curriculum for the Master’s program (see Website 5b), such that the graduates “[can] adequately apply various methods of sequencing and building of (yearly) lessons, or rather the introduction of mathematical terms and concepts through the construction as well as the analysis of teaching sequences” ( Website 5b, p. 210).

This means that the students at this point in their studies are expected to survey an entire teaching year from the perspective of the subject material (mathematics) and subject didactics. A high demand!

Another competency as formulated in the same module description is the potential teachers’ ability to react to the differing pupil behaviors in regard to mathematics in school. The graduates “can adequately apply methods for enhancing attitudes and positions of pupils regarding mathematics and mathematics lessons (“beliefs”, “mathematical worldview”, mathematical self-concept or similar) and utilize these lessons learned for teaching” (Website 5b, p. 210). One recognizes here also the demand from the subject-didactic education that concepts from the program’s research mathematics didactics are to be incorporated into the teaching program at least as descriptions of the desired competencies.

What can subsequently be reported about the practical training component, which includes 30 ECTS points, of the Master’s program?

In both teaching subjects, a total of 20 ECTS points needs to be completed. This means that a mathematics teaching activity with the value of 8 ECTS points is to be accompanied by a mathematics didactics course with 2 ECTS points. This applies, correspondingly, to the second teaching subject. The “courses” for the remaining 10 ECTS points are alternatively organized. The pedagogical-educational science portion in this practical education of the Master’s program presents a unique aspect. A special pedagogical internship with a total of 6 ECTS points must be completed. Here the students are not tied to a school, rather this internship can also be carried out outside of a school environment (e.g., in various youth centers, at the youth welfare office, or in service or information centers for pupils).

<sup>4</sup> At the University of Klagenfurt and the Pedagogical Technical University Burgenland, the “subject didactical research field” is taught, while at the University of Graz and the Pedagogical Technical University Styria further delving into mathematical subjects needs to be completed.

The current societal developments of the past few years have been formative in shaping the nature the final 4 ECTS points. These serve questions of language education with regard to multilingualism and competencies in the use of new media in teaching.

## Conclusion

The previous explanations provide an extract of the current teacher education program in Austria. The extension of the relevant courses of study and the prescribed necessity of university inclusion for the Master's study programs are significant innovations in comparison to the previous teacher-education program. In doing so, the program extension leads less to a broadening of the mathematics subject-specific or didactical education but more to an intensification of practical school experience. If this proves to be warranted will be shown in the future, especially as this practical orientation can create a series of problems. The educational theory orientation of essential portions of the teacher education program, as indicated in the above text, especially which regarding the study of the teaching of mathematics, will remain for the next few years.

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## Teaching and Learning in the Covid-19 Era: The Experience of an Italian Primary School Class

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### Abstract

The authors present a case study, where digital technologies were implemented for online education (particularly, mathematics education) at Italian primary school level. Results of this study confirm that the quick transition to the online form of education, due to the COVID-19 pandemic, was successful and provided experience which may be useful in future didactic activities.

**Keywords:** Teaching, learning & Covid-19

### Introduction

The coronavirus19 pandemic has influenced educational systems worldwide, leading to the widespread closure of schools, universities, and colleges. In response to this closure, UNESCO endorsed the use of distance learning programs, open educational applications, and platforms that schools and teachers could use to reach learners remotely, limiting the interruption of education.

During the COVID-19 pandemic, social media such as *WhatsApp*, *Google meet*, *Google drive*, *Zoom app*, *Microsoft Teams* have become the primary sources of education across the world. In this crisis, technologies have been mastered and used responsibly by educational institutions. Many academic administrators have made online content available for free to assist teachers and students worldwide with distance learning. During the period of lockdown, schools, colleges and Universities have moved online: Learning institutes and teachers have been promoting e-learning among their students, ensuring that all of them can benefit. There are some possible situations of inequality owing to difficulty in connectivity and accessing technology, but, for the present, staying at home has been considered to be the safest solution for everyone.

### Theoretical Background

Beyond this period of crisis, the profound changes taking place in society worldwide increasingly have highlighted the centrality of individual learning and the development of targeted skills.

The attention of the institutions and teaching training experts is nowadays placed, in particular, on informal and nonformal learning spaces (Sutherland & Sutherland, 2010), on the workplace as a strategic skills development venue (Schön, 1993; Weick, 1995), capable of enhancing the skills acquired (Perulli, 2006). In Europe, Lifelong Learning programs have been designed to support the creation of a European learning area (Aleandri, 2011). As in all sectors, innovation will be essential to bring about qualitative changes in education.

In recent years, governments have invested heavily in information and communications technology (ICT) in schools. The quality of school educational resources, including ICT and connectivity, has significantly increased in recent years. Although education is not a "change-averse" area, with improvements already taking place in classrooms, it has not managed to harness technology to raise productivity, improve efficiency, increase quality, and foster equity (OECD, 2016). International surveys have found that digital technologies have not yet been fully integrated into teaching and learning (OECD, 2016). Analysis of the Programme for International Student Assessment (PISA) data on the effects of ICT on students' outcomes adds to the sobering picture. The introduction of digital technologies in schools has not yet delivered the promised improvements of better results at a lower cost. In this perspective, non-formal learning contexts appear to be connected to the spread of new technologies. The fact that information and communication technologies (ICT) first entered families and then schools (Quaglino, 2005, 2014) confirms the importance of informal learning in community life. The non-formal (and informal) environment represents a considerable reserve of knowledge (Schein, 2017) and an essential source of innovation

in teaching and learning methods. For example, the spread of e-learning training, in all its forms (we refer to the different distance learning devices, blended learning, massive learning etc.), shows the advantage of developing a “community of practices” as initially intended (Lave, 1991). A community of practices is a space for reflection and action capable of conveying formal and non-formal learning within educational communities and training organizations (Wenger, 1998). Collecting the experiences of people in a learning situation and understanding the contexts within which to develop the didactic training design is thus central to the design of scenarios favourable to the teaching-learning processes.

Many studies have already examined the effectiveness of e-learning, investigating the relationship between instructional materials and their structure, the teaching strategies, the abilities and behaviour of students (in terms of their self-discipline when using the Internet as the primary teaching tool) (e.g., Alenezi, 2020; Duffy & Jonassen, 2013). Past research has shown that perceived resources play an essential role in the success of information system adoption (Noesgaard & Ørngreen, 2015). Technology users are strongly motivated when they perceive the presence of necessary resources. It is reasonable to assume that this perception also leads to the adoption of better online learning. The construct of perceived resources was included in this research to examine the influence of an individual’s belief in having the necessary resources for using an online learning system.

In this period of crisis, Zimmerman (2020) recently compared online and traditional learning in an article entitled *Coronavirus and the Great Online-Learning Experiment*, arguing that teachers often fail to make the connection between what we do in a physical classroom and what we do online. Education is mainly a relationship. In this crisis situation, we are aware that we have not only to keep the didactic and formal learning aspects alive, but also to exercise our educational role, maintaining a high level of motivation and student involvement.

In Italy, the Ministry of Education issued a statement, clearly stating that distance teaching, in these difficult weeks, had and has two meanings. It urges the entire educating community to exercise its professional and ethical responsibility to continue to pursue the social and educational task of schooling, but not at school, and maintaining, in fact, the community. Keeping the school community alive obviates the risk of isolation and demotivation; the interaction between teachers and students can be the glue that maintains and strengthens relationships, sharing the challenge facing us (MIUR, Ministerial note 388 of 17 March 2020).

So how can we systematize informal learning moments and support the development of life skills in students, such as communication and interpersonal skills, critical thinking and self-management skills?

Life skills are abilities for adaptive and positive behaviour, which enable individuals to deal effectively with the demands and challenges of everyday life (WHO, 2020). Described in this way, skills that can be said to be life skills are innumerable, and the nature and definition of life skills are likely to differ across cultures and settings. However, analysis of the life skills field suggests that there is a core set of skills that are at the heart of skills-based initiatives for the promotion of the health and well-being of children and adolescents. These skills are: Decision-making, Problemsolving, Creative thinking, Critical thinking, Effective communication, Interpersonal relationship skills, Self-awareness, Empathy, Coping with emotions, and Coping with stress (WHO, 1997).

In a typical classroom, anything can happen: Some students laugh, another teacher or a collaborator drops in, the computer does not work, someone asks to go to the bathroom. All this may hinder our lesson plans, but adds variety to our lessons; that is, it allows us to adjust the learning rhythm and to lower, if necessary, the cognitive rate required by the activities. While it is not possible to virtually reconstruct the classroom context and replicate its management methods, it is feasible, indeed indispensable, to implement some group management strategies remotely, in order to carry out our educational function even at a distance. This is the real question: Is it merely about transferring our management strategies into a new context or rather acquiring new ones?

To make this possible, teachers should work on two aspects to an even greater extent than previously: attention to students and focusing on explicit and implicit purposes. First, be aware of the attention to the online signals coming from the students and of our reactions to them and, second, concentrate on what we propose, on how we propose it, and on what thoughts pass through our mind during “classless” teaching. There is one thing that does not change, in the real and the virtual, and that is the attention to our levels of awareness, which we find in the thoughts that arise spontaneously, in the will to explain again a concept that seemed acquired or to endure yet another interruption due to technical problems or the attitudes of some students.

What does not change, in physical or online classes, is the ability to manage ourselves, in order to be able to fully manage, in our unchanged educational task, the new relationships via technology that continue and will continue to involve real people, with their emotions, their moods, their dreams, and their needs. Some authors (Basilaia &

Kvavadze, 2020) suggested stepping back and taking a deep breath, thinking deeply about the educational goals before proceeding with the plan of an online learning experience. Focus on developing an online learning experience rather than just online content delivery. Generally, a person does not become an excellent online instructor without having first been an online student. So, it could help to take the opportunity to learn more about best practices around the net. Also, it is essential to learn about ways to communicate the teacher’s personality and to teach style in the online context and, last but not least, take a positive approach and seek to use this as an opportunity to do some educational research about your online teaching style.

There is, therefore, a need to remodel the distance that separates us from the students to offer closeness even if we are far away, and to live, in an uncertain present, the possibility of a future that we do not know and that perhaps will improve the society of tomorrow.

**The Didactic Experience**

**The Research Group**

The experience illustrated here arose in the context of our research group (“Nucleo di Ricerca in Didattica della matematica”, Department of Mathematics and Geosciences, University of Trieste), made up of a diverse group of teachers from nursery school, primary school, middle school and high school (teaching children and teenagers ranging from 3 to 19 years old) and led by university lecturers involved in multiple activities aimed at promoting and improving the teaching of mathematics at varying school levels.

In the periodic group meetings, difficulties, gaps and misconceptions are highlighted and we endeavour to find together “prevention” and “solution” strategies to them. Our activity is also “outward-looking” and “open to others” with the organization of events to promote mathematics among children and teenagers, and to offer initial or in-service training for teachers; among these, should be remembered, in particular, the “La matematica dei ragazzi” event, which has been held every two years since 1996 and in 2018 reached its 12th edition (see Leder, Scheriani & Zuccheri, 2002; Zuccheri & Zudini, 2014). In 2020, owing to the spread of the COVID-19 virus, the event was postponed (the date is still to be decided) for reasons of safety.

**The Case Study**

The experience illustrated here deals with teaching at primary school level (in Italy, primary school level lasts 5 years: from first to fifth year, with children aged 6-11 years) by one of the authors of the paper, Daniela Leder. She became a permanent member of staff in 2000 and in recent years has been the “main teacher”, teaching Italian, mathematics, science, art and English. In the school year covered by our study (2019/2020), she taught the 5E class (“Scuola Foschiatti”, “I.C. Valmaura”, Trieste), made up of 17 students: 6 girls and 11 boys.

**A Week at School Prior To Covid-19**

Daniela Leder’s timetable as 5E’s teacher prior to COVID-19 (September 2019-February 2020) was the following (see Figure 1):

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
8.10-9.10	Daniela Italian	Daniela Mathematics	Daniela Italian	Patrizia R.E. / Daniela	Daniela Mathematics
9.10 – 10.00	Daniela Italian	Daniela (“dual presence”)	Daniela Italian	Daniela Science	Daniela Mathematics
10.00 – 10.20	<i>Break</i>		<i>Break</i>	<i>Break</i>	<i>Break</i>
10.20 – 11.10	Daniela English		Daniela Mathematics		Patrizia R.E. / Daniela
11.10 – 12.10	Daniela Mathematics			Daniela Italian	Daniela English
12.10 – 13.10	Daniela Science		Daniela English	Daniela Mathematics	Daniela Italian
13.10 – 14.10			<i>Lunch</i>		
14.10 – 15.10			Daniela Art		

**Figure 1. Daniela Leder’s timetable in class 5E prior to COVID-19 (“Patrizia” is the name of the colleague who taught R.E./ Religious Education. Daniela was responsible for the students who did not take part in the R.E. lessons. On Tuesdays, instead, there was “dual presence” where Daniela acted as support for another teacher in the same class)**

### The Weeks at School in the Covid-19 Era

From the moment that, owing to the spread of COVID-19, schools were closed (from March 2020, in Italy and specifically in the Region of Friuli Venezia Giulia, where Trieste is located), the teacher adopted online teaching/distance learning. The technical and legal aspects were discussed with colleagues and the head teacher. When analysing the activity *a posteriori*, four phases emerge in the activity of online teaching regarding the interaction developed by the teacher with her students:

#### Phase 1: 2nd - 6th March 2020

Some very simple revision exercises were sent via email to a mother (the class representative) who in turn forwarded them to the other parents.

#### Phase 2: 9th - 16th March 2020

An email address was created *ad hoc* for the students. The *Edmodo* platform was activated and, on 12th March, the first message was sent. The activities were sent subject by subject. The materials were collected and stored, via email, on *Drive*, where there was a file for every child, which was shared with the parent, or on *Edmodo*. The first trial run was carried out this week via *Skype* and then via *Zoom*.

#### Phase 3: 16th March -5th April 2020

The activities were presented according to the school timetable, day by day. The weekly plan was sent on Fridays so that working parents would have time to download all the material and give it to the pupils (many of the pupils' parents work). Three times a week (Monday, Wednesday and Friday), there was a 40-minute class video call on *Zoom* in the afternoon (in the morning, many pupils were unable to connect because the device was shared with brothers/sisters or with their own parents, who were all at home, each busy with lessons or remote working).

#### Phase 4: 6th April 2020 - the end of the school year (June 2020)

Group work began with a daily appointment: the first group in the morning, the second in the afternoon and then everyone together on Friday afternoon (sub-division into two groups was a decision necessitated by competing commitments in the family, with parents, brothers and sisters all involved in remote-working/distance learning). Thus, the class passed from no meetings to one and then two/three meetings a day, at first for 40 minutes and then for about an hour/an hour and a half, (which, in reality, was generally slightly more). If, at the beginning, the aim of the meeting was to build up the group feeling, as time went on, the didactic element regarding each subject was added.

Therefore, school “attendance” became the following (see Figure 2):

	ITALIAN	MATHEMATIC S	ENGLISH	ART
MONDAY	9.30-10.00 and 15.30-16.00	10.00-10.30 and 16.00- 16.30		
TUESDAY	9.30-10.00 and 15.30-16.00	10.00-10.30 and 16.00-16.30	10.30-11.15 and 16.30-17.15	
WEDNESDA Y	9.30-10.00 and 15.30-16.00	10.00-10.30 and 16.00-16.30		10.30-11.00 and 16.30-17.00
THURSDAY	9.30-10.00 and 15.30-16.00	10.00-10.30 and 16.00-16.30		
FRIDAY	9.30-10.00 and 15.30-16.00 all together 16.30-17.00	10.00-10.30 and 16.00-16.30		

Figure 2. Daniela Leder’s timetable in class 5E in the Covid-19 Era

Generally, regarding primary schools (but the same applies to the later levels), a right balance should be found, according to age, between remote teaching activities and breaktimes so as to avoid the risks arising from an excessive amount of screen time.

### Some Examples: Contents and Methods for Mathematics Education

In order to give an example, we consider below two typical remote teaching weeks for mathematics (the first from Monday 27th to Thursday 30th April 2020 - Italy celebrates 1st May as a national holiday; the second from Monday 4th to Friday 8th May 2020). We focus particular attention on the themes taught and the methodology employed to deal with them.

For both weeks, the work for science and English was sent by email. In “class”, Italian, mathematics, art and English were covered (see the timetable in Figure 2). Every day, after having asked every child how he/she was, lessons began by checking homework and went on, working together.

Monday 27th to Thursday 30th April 2020

Monday

Mathematics

Oral test on polygons (after having done the quiz on *Edmodo*). While the teacher questioned one student, the other children were able to begin doing their homework: from the geometry workbook, on perimeter and area.

Tuesday

Mathematics

Revising the meaning of mean, median and mode with exercises.

Wednesday

Mathematics

Reasoned constructions of polyhedrons with toothpicks or marshmallows.

The children began to understand the minimum number of toothpicks needed to construct a polyhedron (4). They observed that cylinders and other solids with curved surfaces cannot be constructed. The terms “prism” and “pyramid” were introduced.

The class was reminded that they had made Sierpinski trees for Christmas, using cardboard tetrahedrons. The teacher showed them one and the differences were noted: With toothpicks, the edges and vertices are highlighted, but the solid is “perforated”, and you cannot see the area or the development.

Thursday

Mathematics

Construction of rotating solids starting from plane figures (for the cylinder, many rectangles folded in half and stuck together were used). Registration in the exercise book of work done.

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Monday 4th to Friday 8th May 2020

Monday

Mathematics

The class read together in the textbook the meaning of “developing the solid” (hinted at in the previous lesson). The teacher took a toothpaste packet and opened it. Together, the class drew the development in the exercise book and made observations.

Tuesday

Mathematics

The volume of a parallelepiped was dealt with. A discussion was held as to what could be used to fill the toothpaste carton from the previous lesson. The children said in order: a liquid, a powder (flour, salt, sand), coarse salt, rice, maize, beans, grapes. Grapes were suggested as something pearl-shaped which, however, being spherical, were no good. Thus, casting around for something with more edges, they came upon the cube. Every suggestion was accepted and the class talked together as to how well the space could be filled or not.

Some pupils asked whether this applied also to the cylinder or sphere. The teacher suggested (maybe) talking about this later on.

Homework was given, consisting in cutting out a 20-centimetre-sided square and two circles with different radii.

Wednesday

Mathematics

Exercises on the area and volume of the parallelepiped and of the cube. In order to understand better, the solids were constructed out of paper.

Thursday

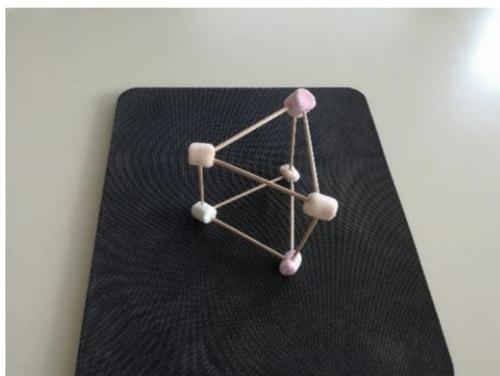
Mathematics

Exercises on the area and volume of the parallelepiped and the cube.

Friday

Mathematics

More exercises on the area and volume of the parallelepiped and the cube.



**Figure 3. Polyhedron constructed by the children (Photo by Daniela Leder)**

### Some Remarks

The experience of the COVID-19 pandemic has caused everyone (*in primis*, those directly involved - teachers, students and their parents) to reflect a little on the role of technology in teaching and on teaching in general.

After a first phase of the emergency, various aspects emerged.

With regard to teaching in general, the lack of an essential element - the relational aspect - was immediately felt, in particular, physical contact: For primary school children, an affectionate gesture, such as a pat on the head, or practical help in an activity, is worth much more than remote voice support.

“Time” became a problem: With remote learning, lessons must be brief (and this also happened in class), but, above all, there may not be enough time to carry out and finish a piece of work. The teacher and the pupils can start together, but then the children must finish the work by themselves at home in order to show it to the teacher the day after, if it is an object, or send a photo if, it is written work... And the parents, who, in the meantime, are working, cannot always be diligent in sending the material: Some are only able to do so once a week (thus, twenty files arrive all together), others have to be chased up... only two pupils, from the middle of May onwards, became independent in doing this.

When the children were asked their opinion about the experience, the majority said that they had missed being in class together... A few pointed out that there had also been positive aspects: There had been less homework and it had been possible to get up later in the morning... As time passed, however, the children tired of the situation: Even if there had been less homework, there had been no trips or handicrafts or other activities that they had done and enjoyed before. When asked which week had been the most noteworthy or interesting for them, some pupils were at a loss as to what to say. When pressed, the majority underlined missing their classmates (they saw each other all together only on Fridays), as if they had not felt complete. However, some children remembered the days when the concept of volume was defined ( collective discussion) and the first week of video meetings (they still remembered the excitement ).

Observations by the teacher were also noteworthy regarding the experience of remote teaching lived during the pandemic of COVID-19. The necessity of mastering the digital tools had been a positive element for her: She discovered and used resources which before she had only seen fleetingly. The NEGATIVE part (written in capital letters) however lies in the fact that remote teaching lacks the relational aspect, nearness, which only being physically present can achieve: Interacting for real is very different from only partially seeing each other (often only the children’s faces can be seen...) via video. Given her normal teaching methods, where skills are acquired, remembering that “you learn through discussing” (cooperative learning: See, e.g., Pontecorvo, Ajello & Zucchermaglio, 2007) - if possible in groups - and where the workshop approach is favoured wherever possible, remote teaching is not sufficient and is limiting, only to be adopted where absolutely necessary.

It is true that the teacher learnt to use interesting tools, tools which she will use again perhaps in the future (her exact words). The teacher deliberately used the word “perhaps” because, in the act of teaching, you are not alone and, particularly when dealing with primary school children, family involvement is taken for granted.

In order for it to happen, remote teaching requires that everyone involved (teacher and children) have access to the necessary devices and are able to use them appropriately. For various families, this often meant that parents and children had to share the devices, as they were all engaged in remote activity (some for work and some for study). This obviously had repercussions on class teaching, in terms of timetabling and the way these tools were used. Furthermore, so as to avoid risks attached to excessive use, the children could not indulge in too much screen time (the device was sometimes a smartphone). It should also be noted that, for primary school children, parents’ intervention is often needed when logging on to the device, often being called to assist their children in the correct and safe management of technology.

Think, for example, about sending homework: During the emergency period, the students’ homework was collected in three different ways (*Edmodo*, *Drive* and email), not so much because the teacher wanted it thus, but because it might simplify the “work” of the parents. Some parents were even too involved and present, while others were practically absent; among the parents, there were those who would have wished for more remote teaching hours, while others would have wished for fewer. It is true that not all parents had the time to learn how to use the new tools and, in any case, at the beginning of the experience, the teacher herself had to help them by offering, as far as she could, “technical assistance”. It was only from the middle of May onwards, as already said, that some children began to send homework by themselves: good for them! However, there were only a few of them... in reality, only four... However, it should be noted that, by the end of the school year, all the children had developed various technological abilities (for example, using at the same time various windows or different devices).

A few comments can also be made on how the teacher’s day changed, in that, with the aim of meeting the needs of her students to the best of her skills and abilities, she ended up in front of the computer from 8 a.m. until late afternoon (at the beginning, only with the tablet), using her own internet at her expense. Her typical day, therefore, was closely linked to the computer: at the beginning of the working day, sifting through the material received (checking her emails and files on *Drive* and on *Edmodo*); then, checking over the day’s lesson, perhaps to add something; then, logging on to do the video lesson of the morning. The lunch break was about one hour. While waiting for the afternoon’s lesson, and after, there were preparation of materials, marking homework, training via webinars and studying new tools for presenting themes and collecting homework and/or meetings with children’s parents and with colleagues.

Beyond the activities mentioned, which are rightly part of distance learning, there were school meetings (teachers’ council, interclass) and those linked to the duties, which the teacher had during the school year in her educational institution (e.g., group coordinator for preparing tests).

In practice, she was often to be found still in front of the computer at 18-19.00... and at 20.00 she forced herself to turn it off. The sensation was that of never really signing off and of having messages continually arrive which required answering (every file sent, in fact, was analysed) and she looked forward to the weekend to have, at least in part, a break (the files could arrive even on Saturday and Sunday). In any case, how could she not reply to work sent by a pupil?

The experience of class 5E and their teacher is certainly one in a thousand, even million, in the world... and every class has its own story..., but the observations that have been made are very interesting seen from the point of view of how we all may use remote teaching profitably, even in different contexts (not necessarily in an emergency).

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## The Effect of Online Learning Attitudes of Sports Sciences Students on their Learning Readiness to Learn Online in the Era of the New Coronavirus Pandemic (Covid-19)

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### ABSTRACT

The aim of this research is to examine the effect of online learning attitudes on online learning readiness of sports sciences students during the period of coronavirus pandemic (covid-19). The research was designed with the correlational survey model. The population of research consisted of sports sciences students from the faculty in seven state universities in Turkey. The sample consisted of 599 (271 female + 328 male) sports sciences students studying at the Departments of Coaching Training, Physical Education and Sports Teaching, Recreation and Sports Management, selected by the easy sampling method from these faculties and taking courses from the online learning platform. Data in the research was collected by using “Online Learning Attitude Scale”, “Online Learning Readiness Scale”, and “Personal Information Form”. The data was analyzed using descriptive statistics, Pearson's correlation and regression analysis. According to the research findings; There is a moderately significant positive correlation between online learning attitude and online learning readiness ( $p < .05$ ). Also, online learning attitude was found to have a significant effect on online learning readiness ( $p < .05$ ). As a result; In the field of sports sciences, the necessity of establishing a positive online attitude and creating a basis for a successful online learning readiness to provide a good online learning to the learner has been put forward.

**Keywords:** Sports sciences, Covid-19, Online learning attitude, Online learning readiness.

### INTRODUCTION

The fact that technology constantly renews itself and adapts to the conditions of the day has shown itself in the field of education as in many other fields. Education areas try to keep up with the conditions of the day by moving to new learning environments along with technological developments. One of these new learning environments is undoubtedly online learning environments.

Online learning has become a concept that is being examined day by day in the field of education and representing technology in the field of education. Online learning in the literature has also been expressed as “blended learning”, “e-learning” and “distance learning” (Isaac, Aldholay, Abdullah, and Ramayah, 2019). In this globalized and digitalized century, governments, educational institutions, and companies around the world have increasingly started to encourage online learning, and as a result, the transition from traditional face-to-face classrooms to distance and online learning has increasingly continued (Aldhafeeri and Khan, 2016). In online learning, students needed a presentation method besides being away from teachers, in other words, the traditional classroom environment (Wang, Shannon and Ross, 2013; Wilde and Hsu, 2019). In addition, in this learning, the interaction between students and teachers is mediated by technological opportunities and has a significant impact on learning outcomes (Bower, 2019; Gonzalez et al., 2020; Wang et al., 2013). Online learning has become very popular in the educational environment (Pillay, Irving and Tones, 2007). In online learning that has been studied

over the years, effective online teaching results from careful design and planning (Hodges, Moore, Lockee, Trust and Bond, 2020). Online learning is defined as a form of education carried out through a browser or applications without the need for additional software and learning resources by Horton (2000). In addition, Clark and Mayer (2016) expressed online learning as the use of digital tools to give some instructions to the other person with the internet.

Advanced technology has made learning online easier as a new mode of learning in recent years. Namely, students can access the emerging online learning environment without time and place constraints by using the internet and different online learning platforms. In addition, this learning mode provided more flexibility in learning environments as there is no time and space restriction (Hwang, Wang, & Lai, 2020). As a matter of fact, learners were able to gain experience of learning from their places through computer and the internet (Benson, 2002; Carliner, 2004; Conrad, 2002). Studies have shown that the materials and videos used in online learning make students feel like they are taking lessons in the classroom (Chen and Wu, 2015). In addition, online learning provides the opportunity to repeatedly listen to what is wanted to be learned by watching the lessons over and over again (Brecht and Ogilby, 2008). To achieve versatile online learning (Vandenhouten, Lepak, Reilly, & Berg, 2014), an online learning attitude (Daniels, Tyler, & Christie, 2000) and online learning readiness (Hukle, 2009) are required. Online learning attitude is defined as “the desire and the manner of the individual towards online learning” (Hergüner, Son, Hergüner-Son and Dönmez, 2020). Readiness in online learning is defined as “being mentally and physically prepared for some online learning experiences and actions” (Borotis and Poulymenakou, 2004).

The fact that students, who are one of the most important elements of online learning environments, have a positive or negative attitude towards these learning environments has a great effect on learning (Alomyan & Au, 2004). In studies conducted to examine the effect of attitude on student behaviors, it was concluded that opposing feelings, interests, and thoughts related to a subject affect the behaviors that are or will be exhibited (Pierce, Stacey and Barkatsas, 2007). As a matter of fact, positive attitudes allow students to exhibit positive behaviors towards a lesson and make more effort to learn (Kara, 2010). In addition, a positive attitude towards learning allows students to be diligent towards learning the knowledge and skills that are useful to them in life, and ultimately to be ready in terms of behavioral, emotional, and psychomotor aspects required in the lesson (Tsai and Kuo, 2008; Scheiter and Gerjets, 2007; Yang and Lau, 2003; Merisuo-Storm, 2007; Yudko, Hirakawa and Chi, 2007). In short, students' attitudes should be taken into account in online learning platforms (Daniels et al., 2000).

Another variable that affects the success of online learning environments is readiness towards online learning (So & Swatman, 2006). Readiness, which has an extremely important place in the education process, is one of the important inputs of the learning-teaching system (Bloom, 1995). Readiness is the student's introductory level to the subject, and his / her prior knowledge and attitude (Yenilmez and Kakmacı, 2008). It is extremely important to determine students' level of readiness before starting online learning (So & Swatman, 2006) for student success (Yurdugül and Alsancak-Srakaya, 2013). Considering the strong relationship between online learning readiness and online learning (Kruger-Ross and Waters, 2013; Kaur and Abas, 2004), it can be said that the progress of online learning is through online readiness (Hukle, 2009). Research has shown that success in online learning environments is directly related to online readiness (Kruger-Rose and Waters, 2013; Galy, Downey and Johnson, 2011; Artino, 2009; Mercado, 2008). Considering the relevant scientific studies, “Online learning readiness can be possibly defined as the state of being physically and mentally motivated for online learning by providing auto-control among individual's learning time, environment, materials, learning strategies, methods and techniques.” Also, it can be said that the individual can achieve online readiness at the rate of the access to technological tools and the internet, the ability to use social networks, technology literacy skills and individual learning responsibility.

In order to be ready, which is expressed as having the information required to experience the online learning experience in the most effective way, the individual must have attitude and motivation (Yurdugül and Demir, 2016). As a matter of fact, Hergüner et al. (2020) stated that a positive online attitude will form the basis for successful online learning readiness. The strong relationship between these two concepts has undoubtedly made online learning environments more successful. In addition to the developing and changing technological conditions, educational institutions have made a rapid transition to online learning due to the epidemic experienced today.

Covid-19 infection, which emerged in Wuhan, China in December 2019, was declared as a pandemic by the World Health Organization (WHO) on March 11, 2020 (Cucinotta & Vanelli, 2020). Most governments around the world have tried to prevent the spread of this contagious disease by imposing closure, social distancing, face-

to-face education avoidance, and restrictions on human mobility (Zheng, Khan and Hussain, 2020). Higher education institutions in the countries have aimed to transition to a safe and healthy learning environment in order to protect students, academic and administrative staff and slow the spread of the virus (Cao et al., 2020; Huang et al., 2020). The Covid-19 pandemic has led to a digital revolution in education with the use of online learning environments, digital books, teleconferences, and virtual classrooms (Kapasias et al., 2020; Sutton and Jorge, 2020). Many universities have transferred their courses to online learning environments (Ali, 2020; Crawford, Butler-Henderson, Rudolph and Glowatz, 2020; Huang et al., 2020). It appears that books and materials from traditional learning environments are changing wherever possible and that various online learning platforms (national television programs or social media) are being created. In addition, some educational institutions have announced holidays to prepare for the distance education environment (Gonzalez et al., 2020). In our country, on March 16, 2020, face-to-face education was suspended in schools and the distance education environment was started. One of the disciplines that interrupt face-to-face education is the field of sports sciences. As in all disciplines, online learning environments have been rapidly adopted in the field of sports sciences. With this research, it is aimed to examine the effect of students' online learning attitudes on online readiness in the field of sports sciences, which is multidisciplinary. It is seen that online learning has increased in today's world due to technological developments and the covid-19 pandemic. This study, which includes some sciences and is multidisciplinary, is considered to be important in terms of being the first in the field of sports sciences and leading future studies. The purpose of this research conducted in this context is to examine the effect of online learning attitudes on the online learning readiness of sports sciences students during the period of renewal and coronavirus pandemic (covid-19).

**METHOD**

**Research Model**

The research was patterned with the “correlational survey model” from quantitative methods. Correlational survey model is “research models aiming to determine the existence and / or degree of change between two or more variables” (Karasar, 2018, p. 114).

**Research Population and Sample**

The universe of study of sports sciences seven state universities in Turkey has created for students in the faculty. The sample consisted of 599 (271 female + 328 male) sports sciences students studying at the Departments of Coaching Training, Physical Education and Sports Teaching, Recreation and Sports Management, selected by the easy sampling method from these faculties and taking courses from the online learning platform. The average age of the research group is 21.72.

Table 1. Descriptive statistics of the research group

<b>Gender</b>	<b>n</b>	<b>%</b>
Female	271	45,2
Male	328	54,8
<b>Department</b>	<b>n</b>	<b>%</b>
Coaching Training	127	21,2
Physical Education and Sports Teaching	187	31,2
Recreation	82	13,7
Sports Management	203	33,9
<b>Universities</b>	<b>n</b>	<b>%</b>
Sakarya University of Applied Sciences	258	43,1
Kırıkkale University	106	17,7
İstanbul University-Cerrahpaşa	84	14,0
Marmara University	56	9,3
Kırşehir Ahi Evran University	34	5,7
Bartın University	33	5,5
Kocaeli University	28	4,7
<b>Total</b>	<b>599</b>	<b>100,0</b>

Table 1 includes descriptive statistics results of the students participating in the research. According to the analysis result, 45.2% (n = 271) of the participants in the research are females; 54.8% (n = 328) of them are male students. According to the departments attended; Coaching training of 21.2% (n = 127); 31.2% (n = 187) of them were physical education and sports teachers; 13.7% (n = 82) of them are recreation; It is seen that 33.9% (n = 203) consisted of students from sports management department. 43.1% (n = 258) from Sakarya University of Applied Sciences; 17.7% (n = 106) from Kırıkkale University; 14.0% (n = 84) from Istanbul University-

Cerrahpaşa University; 9.3% (n = 56) from Marmara University; 5.7% (n = 34) from Kırşehir Ahi Evran University; 5.5% (n = 33) from Bartın University and 4.7% (n = 28) from Kocaeli University were included.

### **Data Collection Tools**

In the research, the data was collected with the “Personal Information Form” prepared by the researchers, “Online Learning Attitude Scale” developed by Usta, Uysal, and Okur (2016), “Online Learning Readiness Scale” developed by Hung, Chou, Chen, and Own (2010) and adapted to Turkish by Yurdugül, and Alsancak-Sırakaya (2013). Detailed information on measurement tools is given below.

### **Personal Information Form**

Within the scope of the research, the "Personal Information Form" created by the researchers was used to determine some demographic information of sports sciences students. In this form, it is aimed to reach information such as gender, age, university, and department of the students.

### **Online Learning Attitude Scale**

"Online Learning Attitude Scale" developed by Usta, Uysal, and Okur (2016) was used to determine the attitudes of sports sciences students towards online learning. The measuring tool consists of 20 items in 5-point Likert type (1 = Strongly disagree, Strongly agree = 5). It was determined that the measurement tool had 4 factors: "general acceptance ( $\alpha = .77$ )", "individual awareness ( $\alpha = .85$ )", "usefulness ( $\alpha = .79$ )" and "application effectiveness ( $\alpha = .68$ )". The overall Cronbach Alpha internal consistency coefficient of the measurement tool was calculated as .90 (Usta, Uysal, & Okur, 2016). As a result of the present research, the Cronbach Alpha internal consistency coefficients of the scale were determined as .67 for general acceptance, .88 for individual awareness, .82 for application effectiveness, .58 for implementation effectiveness, and .91 for the overall scale. In this study, statistical operations were performed over the total score in terms of suitability to the purpose of the research.

### **Online Learning Readiness Scale**

To determine the readiness of sports sciences students for online learning, the “Online Learning Readiness Scale” was used, which was developed by Hung et al., (2020) and adapted to Turkish by Yurdugül and Alsancak-Sırakaya (2013). The measuring tool consists of 18 items in 5-point Likert type (1 = Strongly disagree, Strongly agree = 5). It has been determined that the measurement tool is based on that has 5 factors including “computer and internet self-efficacy ( $\alpha = .92$ )”, “self-directed learning ( $\alpha = .84$ )”, “learner control ( $\alpha = .85$ )”, “motivation for learning ( $\alpha = .80$ )” and “online communication self-efficacy ( $\alpha = .91$ )”. The overall Cronbach Alpha internal consistency coefficient of the scale was calculated as .87 (Yurdugül and Alsancak-Sırakaya, 2013). As a result of the present research, the Cronbach Alpha internal consistency coefficients of the scale were .87 for computer / internet self-efficacy; .75 for self-directed learning; .74 for learner control; .83 for motivation for learning; .79 for online communication self-efficacy and Cronbach Alpha internal consistency coefficient for the overall scale was determined as .91. In this study, statistical operations were performed over the total score in terms of suitability to the purpose of the research.

### **Collection of Data**

Before the research data were collected, necessary permissions were obtained from the ethics committee of Sakarya University of Applied Sciences (date 08/05/2020, number E.3789). Due to the coronavirus (Covid-19) epidemic, research questions were transferred to the online data collection system with Google form. Questions transferred to the online system between 24.05.2020 and 24.06.2020 were conveyed to the online learning platforms of the students through the deanship, department heads, and faculty members in the relevant faculties, and data were collected from those who voluntarily participated in the study. In addition, general information about the research, and the purpose of the research was given at the beginning of the research form, and approval of the voluntary participation form was added. After the students approved the button on the form, they participated in the research.

### **Analysis of Data**

The raw data obtained from the students through Google forms were transferred to an Excel file, checked and encoded and transferred to the SPSS package program. In order to decide on statistical analysis, normality test was applied to the data. As a result of the statistical process, it was determined that the data showed a distribution in the range  $-1 > \dots, < + 1$ . It is accepted that these values are suitable for normal distribution (Tabachnick and Fidell, 2013). Descriptive statistics, Pearson's correlation and regression analysis were used while analyzing the data.

## FINDINGS

Table 2. The relationship results between the online attitudes of sports sciences students and their online readiness

		Online Learning Readiness	
Online Learning Attitude	r	,62	
	p	,00**	

In Table 2, Pearson correlation analysis results showing the relationship between sports sciences students' online attitudes and online readiness are given. The result of the analysis showed that there was a moderately significant positive correlation between the online attitudes of sports sciences students and their online readiness ( $r = .62$ ;  $p < .01$ ).

Table 3. The effect of sports sciences students' online attitudes on their online readiness

Model	B	Std. Error	$\beta$	t	p
Stable	32,65	1,64	---	19,87	,00
Online Learning Attitude	,52	,03	,62	19,30	,00

R= ,62      R<sup>2</sup><sub>adj</sub>= ,38  
 F<sub>(1,597)</sub> = 372,41      p= ,00

Dependent variable = Online Readiness

Method: Enter

In Table 3, simple linear regression analysis results are given to determine the effect of online attitudes of sports sciences students on their online readiness. As a result of the analysis, it is seen that the regression model is statistically significant. When the t-test results regarding the significance of the regression coefficients were examined, it was determined that the online attitude ( $\beta = .62$ ;  $t = 19.30$ ;  $p = .00$ ) had a significant effect on online readiness. It can be stated that 38% of the total variance of online readiness is explained by online attitude.

## DISCUSSION, CONCLUSION AND SUGGESTIONS

Due to the Covid-19 epidemic, a transition to online learning in higher education institutions has been a very complex process. In this research, it was aimed to examine the effect of online learning attitudes on the online learning readiness of sports sciences students during the period of coronavirus pandemic (covid-19). In this context, 599 sports sciences students took online learning platform courses in Coaching Training, Physical Education and Sports Teaching, Recreation and Sport Management Department from the sports sciences faculty of the seven state universities in Turkey joined the research.

As a result of the research, a moderately significant positive correlation was found between the online learning attitudes of sports sciences students and online learning readiness. Besides, it was determined that online attitude significantly predicts online readiness and online attitude has 38% of the total variance in explaining online readiness. This result revealed that to achieve high readiness in online learning, online attitude should also be high.

Online learning that provides education without the restriction of space and time for students; It is to manage the process effectively by interacting between student-student, student-teacher, student-content, or student-system (Moore and Kearsley, 1996). The online learning process is possible with the use of technology as well as being the innovation brought by technological processes. Therefore, this learning process made possible by technology can form theoretical frameworks from a pedagogical perspective as well as current developments (Beldarrain, 2006). During the period when the teacher is not in the same environment, it has become necessary for the student to feel competent, self-confident, and gain a positive attitude (Çatana-Kuleli, 2018). Also, teaching students their own learning style is a goal for the educator, but it should not be overlooked that not all students have the same learning skills (Tichavsky, Hunt, Driscoll and Jicha, 2015). One of the first ways to increase this learning skill is the attitude towards learning. For this reason, the first variable in the research is about attitude. An important variable that affects attitude is the motivation. If the student is motivated, he/she will be determined to achieve his / her goal by being self-disciplined (Kemp, Palmer and Strelan, 2019). Considering the learning process, the learner's attitude towards learning is of great importance in terms of the process (Chapman and Van Auken, 2001). An individual's attitude towards a behavior allows to evaluate the behavior as positive or negative (GarcíaBotero, Questier, Cincinnato, He and Zhu, 2018; Kemp et al., 2019). Likewise, attitudes in the education process; It has a strong effect on learning processes (Ali, 2020), behaviors (Arbaugh, 2000; Arbaugh,

2010; Bernard et al., 2004) and performance (Duarte, 2007; Bråten and Strømsø, 2006; Özden, 2009). In this context, it shows that attitudes are an important tool in students' self-motivation and performance (Love, Love and Northcraft, 2010). Because a negative performance may be associated with a negative attitude (Sadik and Reisman, 2004). If the displayed attitude is negative and negligible, the student's chance of entering the learning process may decrease (Prior, Mazanov, Meacheam, Heaslip and Hanson, 2016). In previous studies in this area, it has been reported that a positive attitude is important in predicting academic achievement (Karagiannopoulou and Christodoulides, 2005; Pierce et al., 2007). This information clearly reveals that the online learning attitude should be positive. The fact that the positive attitude is a variable that directly affects the student's positive readiness towards the course has been revealed. As stated by Hergüner et al. (2020) in their research results, “the necessity of positive attitude due to the nature of learning” has been obtained again within the framework of the current research. In the literature and researches, a positive student attitude will increase interest in learning (Dahalan, Hassan and Atan, 2012) and it is believed that learning will be more satisfying (Sun, Tsai, Finger, Chen and Yeh, 2008; Piccoli, Ahmad and Ives, 2001) and it also affects learning interest (Hannafin and Cole, 1983) and keeps his motivation alive (Peng, Tsai and Wu, 2006; Yang and Lin, 2010).

Another important variable that has a significant effect on online learning attitude and revealed as a result of the research is readiness for online learning. As a matter of fact, Thorndike stated that attitudes are related to readiness (Uçar, 2017). Readiness has been frequently mentioned and emphasized in previous research on online learning environments (Adnan and Boz-Yaman, 2017; Horzum and Çakır, 2012; Shraim and Khlaif, 2010; Hung, et al., 2010; Fogerson, 2005; Watkins, Leigh and Triner, 2004; Borotis and Poullymenakou, 2004; Smith, Murphy and Mahonay, 2003). Examining online learning readiness at the beginning of the education process is important for an effective online learning process (So & Swatman, 2006). In order to benefit from online learning environments sufficiently and to use their advantages, the importance of online learning readiness has begun to be emphasized (Watkins and Corry, 2005) and it has become a concept discussed in the process of offering online learning opportunities in different formats (Smith, 2005). So, success in online learning depends on understanding the readiness of stakeholders in this learning environment (Mercado, 2008; Kruger-Ross and Waters, 2013).

Guglielmino and Guglielmino (2003) and Piskurich (2003) reported in their research that forcing individuals who are not ready to learn online would have negative consequences. Machado (2007) emphasized that online readiness for better use of online learning is important and needs to be researched. Indeed, learning can be explained by the strong relationships between cognitive and motivational processes (Pintrich and Schunk, 2002, Stefanou and Salisbury-Glennon, 2002). An individual who uses cognitive processes well can be successful in learning by motivating herself/himself to learning. The motivated individual will be more effective in performing the behaviors (Lee, Bray, Carter-Wells, Glaeser, Ivers and Street, 2004). Behaviors and readiness are related (Demir, 2015). The positive attitude of readiness can only occur with a positive attitude. Because positive attitude towards online learning directly affects the readiness for online learning (Hergüner et al., 2020). Readiness in online learning is positively associated with learning (Stansfield, McLellan and Connolly, 2004). As a matter of fact, there are studies pointing out the positive effect of readiness on learning (Demir-Kaymak & Horzum, 2013; Hukle, 2009; Watkins et al., 2004; So & Swatman, 2006; Artino, 2009; Galy et al., 2011; Kruger-Rose and Waters, 2013).

In the studies conducted in the literature, the existence of studies showing that online learning attitude is positively correlated with online learning readiness and online learning attitude positively explains online learning readiness (Hergüner et al., 2020) supports the research result. Also, the view that positive attitude in the literature lays the groundwork for positive learning (Bråten and Strømsø, 2006; Sanders and Morrison-Shetlar, 2001; Alomyan & Au, 2004) and readiness (Uçar, 2017; Demir, 2015) is consistent with the research results. The information obtained in the literature and the current research result clearly shows that the way to good online learning is a positive online learning attitude and a good online learning readiness. With this research, the necessity of using online learning environments in both theoretical and practical courses in sports sciences, which is a multidisciplinary field, and the positive attitude and readiness of sports sciences students towards online learning environments have been revealed. In subsequent research; It is recommended that revealing all the sports sciences and online learning conditions of schools in Turkey, the examination of online learning attitudes and online learning readiness, online student engagement of sports sciences students, revealing online socialization situations, besides, similar studies should be carried out on the instructors who are the most important engines and trainers of the education system.

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## What is Psycho-Semiotic Language Use and its Parser, as a New Concept? How Can the Example Modeling for Use in Digital Media and the Process of Creating Digi-Slave Proceed?

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### Abstract

This article has two main objectives. 1. To open a new concept to scientific views by presenting it to the field. 2. To show how the digi-slave creation process can work with the Use of Psycho-Semiotic Language; causing someone to develop a particular attitude in the desired direction and changing the existing one, in other words, changing the existing point of view, giving a new perspective, hence a new thought formation management and concluding it in the desired direction should be added to these. Although not by this name, it is one of the methods used in public relations.

What are the tools for Psycho-Semiotic Language Use? What is the Psycho-Semiotic Language Usage Parser? Which disciplines does it take advantage of? In conclusion in this article which focuses on these issues, it is possible to manipulate the target and captures its mind through the Psycho-Semiotic Language use. This article introduces the Psycho-Semiotic Language Use, which is a new concept and definition based on Ronald Barthes's 'narrative strategy', and deals with the misuse of this language. Mind manipulation can also be achieved through narrative strategies formed through psychological analysis. In the psychological analysis, the effect of digital environments and the issue of raising awareness and taking measures in response to the process leading to become digi-slave are dwelled on. Wishing you to take this into consideration, the subject of the article has been written as a subject that is still being studied and developed.

**Keywords:** Digi-Slave, Psycho-Semiotic Language Usage Parser, Psycho-Semioticists, Psycho-Semiotic Language Use, Fiction-Narrative Strategy, Digital Social Media, Digi-Tracking Specialists, Digital Law, Individual Self Embezzlement, Interaction Law.

### Introduction

“Everything is presentable (!), formal, visual, managed through indicators,

In order to consume, first you should be consumed, here is the 21<sup>st</sup>-century person, you in general” Nevin Algül. What is Psycho-Semiotic Language Use? At the outset, Psycho-Semiotic Language Use is already a field used by public relations. This field has been expanded and defined as Psycho-Semiotic Language Use and is used in this article with this noun phrase for the first time. Public Relations provide the existing perception by changing the perspective and creating a new thought. Of course, the ideal method is performing this action always based on truths; however, the process does not always seem like that in reality. One of the objectives of this article is to define the branch of Public Relations involving this use as Psycho-Semiotic Language Use. Large masses were made ready to be managed by means of indicators. The main starting point is to make the individual who has lost touch with reality to think less. Disrupting his critical and questioning view and thus creating a 21<sup>st</sup>-century human that brings visuality to the fore are aimed. Human profiles expanded over this fabricated prototype became manageable through indicators. Strategies to manage these individuals, who have been transformed into a part of the increasingly digitalized world, from this area that needs to be more and more articulated, can also be obtained and formed from the area it covers in this environment. Talented people who use their computers like a typewriter have no chance of escaping from this administration. Particularly if he is someone who keeps a journal on his computer, if he is well-educated, if his social observations hit the bull's-eye, if he is a genius whose ideas are being patented and whose fictions earn trillions of Turkish Liras and break rating records, and if he proceeds in the advertising and music sector -the article is based on this modeling by the way- his entire life can be managed in a way to go on as a digi-slave.

The decoded genetic-cultural codes, putting pressure on the psychological world of the individual on an individual basis; paralyzing and atrophying it in this way, being able to exploit him in line with its own interests like a slave and manipulating his brain are among the major abuses. For example: to be scared by law and force whenever he says that he is stolen and wants to take legal action. If the individual is a spring with multiple abilities, this discovery (!) that begins in the digital environment can initiate a process that will equip also his real-life with psycho-semiotic language. In our age, the people of the 21<sup>st</sup>-century are already trying to survive

within this use. Although it can be also used in a good way, it is an inevitable fact that it is like an atomic bomb. One of the objectives of this article is to raise awareness and make a description of the situation to which the individual who can be exploited or victimized for personal and/or group interest is exposed in the most accurate way possible, to help to eliminate the possibility of surrounding him.

It can be mooted that the widespread of formalism, which facilitates the use of Psycho-Semiotic Language, is associated with the crisis of representation, which was manifested in the appreciation of impressionism in the 1870s, which is partly a reaction to the spread of photography, and continued in the formal inspections of various 'isms' of the twentieth century (Jensen, Klaus, B., 2005:31). People guided and managed through indicators.

In case we start with psychology and move forward on definitions in order to determine the boundaries better: As If the definition of psycho is accomplished, it means that it is time to define the semiotic now.

Known "Psycho comes from Psychology: The definition of it according to Longman Active Study Dictionary is that: Psychology refers to "1. the study of or science of the minded the way it Works. This is formal usage; informal usage of it: The mind and character of a particular person or group" (Longman, 1983:486 )The other definition comes from [www.vocabulary.com](http://www.vocabulary.com) : "Psychology refers to the study of human behavior and the human mind, or the mental attitude of a group. Your parents will find it hard to understand the *psychology* of the teenager.

*Psychology* is more than just an academic subject. The word refers to the complex mental workings and states a person, group or activity. Marketers use the psychology of consumer behavior to sell you things you don't need. Some self-help books teach you how use psychology - mental strategies and tricks - on someone in order to win arguments or get ahead."

If the definition of psycho is accomplished, it means that it is time to define the semiotic now.

### **What is Psycho-Semiotic Language Use and how does Psycho-Semiotic Language Use take place?**

First of all, what does Semiotic / Semiology / Semiotics mean?

First, the definition of the indicator should be made. An indicator, "In general, is defined as all kinds of forms, objects, phenomena, etc., which may represent anything except itself and which therefore have the characteristics of being able to replace what it represents. Semiotics is the branch of science that examines indicators (Rıfat, 2009: 11)."

Göstergebilim is used as the Turkish equivalent of the words semiotic/semiologic.

Semiotic is used as the base for the choice of the word semiotics. The word Semiotic (Rıfat, 2009: 27) comes from French, and when the etymology of the word is examined, it is seen that it fulfills both visual and linguistic meaning. When it comes to the use of psycho-semiotic language use, only the visual elements come to the mind of the general majority and this is the case even for the well-educated people. The problem arises from this point because languages are actually visual elements based on the indicative (letters)/indicated (meaning), so each of them is indicators. They construct a semantic through indicatives. For this reason, the word "semiotic" has been preferred while creating the noun phrase Psycho-Semiotic Language Use. Although the word semiotic contains both visual and linguistic meaning, it cannot put an end to the usage confusion. An introduction of word or noun phrase that will eliminate the usage confusion here and create the perception in the majority of the public that words can also be designed with fictional "narrative strategies", but that can come out only with a book, will not be included in this article.

### **Public Relations and Psycho-Semiotic Language Use**

The discipline that most benefits from Psycho-Semiotic Language Use is Public Relations. It can even be claimed that it was formed with support from it, or that they were intertwined. And this is why the first is very dangerous because it uses the tools of the latter. For example, you can find all the features of advertising science in Psycho-Semiotic Language Use. In the way it uses it, it can take place in the form of repetitions from a target-oriented content, creating a fairy tale effect, hitting the same place repeatedly, carving the granite rock or attempting to cut it into pieces from the point it hits. Although the most benefitting is Public Relations, even taking into account the possibility of that they may have created each other while one of them remaining secretive, it is interested in all disciplines it is affected from and it is benefitting from the psychological analysis of the target and makes use of it to manipulate, lead, and restructure it, and ensure that it adopts an attitude towards its goal.

Sales can make use of equipment similar to hunting a consumer: Learning and memory, Motivation and involvement, sensation and perception (color, taste, touch, sound), attitudes, changing attitudes and emotions,

personality and self, values and lifestyle, socio-cultural influences, family, personal effects, social class, and culture (Odabaşı; Barış, 2018:77-325).

In order to successfully direct the target, including whoever is in contact and relationship with the target in this Psycho-Semiotic Language Use circle can fulfill such management. The main thing here is the psychological analysis of the individual.

The psycho-semiotic language use, the misuse of which is the subject of this article, can be separated into three for the time being:

1. Harsh psycho-semiotic language use
2. Moderate psycho-semiotic language use
3. Soft psycho-semiotic language use

### **Modeling Psycho-Semiotic Language Use in the Digital Media and Everyday Life Relationship**

“..... I will say Othello that Cassio is very close to his wife,  
Cassio is handsome enough to raise suspicion anyway,  
Just after women's hearts,  
And the Moorish is brave and freehearted,  
The fool thinks those who look honest are also honest,  
Once you put the ring on his nose  
You can take him wherever you want  
Alright, everything is arranged.  
The darkness of hell and night,

Will breed this monster creature to the light of the world” (Shakespeare, 2017:27-28).

If Iago lived in the Digital Age, it can be predicted that he would follow the digital trail of the Moorish, capture the private notes he kept on his computer, if any, and do all the evil through them in a more detailed way and more easily and maybe even prepare particular software for it. Also, imagine that he comes from a multi-disciplinary background and has a lot more collaborators. For example, everyone who would benefit from the Moorish can be included in the work: Even a new digital age Othello can be created out of this.

First of all, Psycho-Semiotic Language Use is performed entirely based on the psychological analysis of the person. Let's concretize by giving an example, the individual is exposed to a series of fictions that he comes across throughout the day, that affects him, that is, that has a reflection in him.

Let's say this person keeps the negative events he comes across during the day in his computer or phone in the form of his personal diary, but while keeping it, he writes poems, lyrics and comments on whatever is happening in his country throughout the day. Suppose that these poems and similar lyrics are played through the digital media as song lyrics and bring high commercial fame and money; Consider that his comments have really an impressive power and there is a group that takes advantage of them: Such a person can be turned into an essential Digi-Slave for an establishment that can use this language. The current period of the world and the slave who has been paralyzed can pass away without even being able to express his right. If the fact that such a person will not be desolated seems inevitable, then it is also reasonable that he will be surrounded by Psycho-Semiotic Language Use to the same extent. It is also reasonable that what is necessary for this will be done because such a person is now at the mercy of this establishment. This establishment can change the method according to the characteristics of the target, while using everything you can think of, such as accessories, fragrances, etc. that affect the target psychologically, including gestures. If the target digi-slave is someone whose personal diary on his digital devices is constantly looted and used, the feeling and perception that he is constantly under surveillance shall be sent to him through many channels throughout the day. If he mentions in his diary that the person in an incident that he was exposed to and was uncomfortable with was wearing a hooded sweater, this content now means that it will be included in the Psycho-Semiotic Language Use and will be used as an element of oppression from time to time. This complex period in world history and the upsetting moral and value judgments where the person who holds the power is full of pride, the suggestions about what the digi-slave individual is able to do psychologically in order to survive may be the subject of another article. The fact that the players are able to come out personally and lead the opinion and lead in ensuring security in digital environments inevitably shows the necessity of blocking the road to become a digi-slave.

Example of the Psycho-Semiotic language use II (metaphorical): If the names that you have noted down in your personal diary and/or on your smartphone are asked by someone the very next day, if keywords are used from the content and these occur consecutively, this falls under the language part of Psycho-Semiotic language use. If the photos of those people are somehow gain on you, it also falls under the visual part of the psycho-semiotic

language use. Another example: if you have written something about Rumi in your diary on your computer at night and your roommate in your working environment shows up with a miniature Rumi statue in his hand and if you have witnessed many linguistic and visual coincidences (!) from the same person before, welcome to the Psycho-Semiotic language use. So what happens next? Plenty of things... The person you have mentioned and complained about has a wide range of use such as voice, movement, .... They are all started to be used against you *as a weapon of social war (this is an explicit war)*. This is the most moderate one and only on an individual basis. It is so dangerous that you may suddenly find your brain '*reset*'/ '*reformed*', however, you may not notice it. How did the spring come to the Arabs (brothers)? How can all innocent democratic demands (or any end) be turned into means of imperialist ends? This can be done to direct the individual to write.

Psycho-Semiotic Language Use according to the target (fictional narrative strategy): As mentioned before, if the person is "the goose that lays the golden eggs" that will bring a lot of commercial profit and caught by a team that can easily access and use the diary he keeps on his personal computer, he will smoothly dragged to the environment controlled by this team. His or her psychological analysis has already been made based on what he or she wrote on his or her personal computer. Particularly if he is observed to be an indispensable person caught during the university years, he can be drawn into an academic environment that is already implementing Psycho-Semiotic Language Use. What is the good of science? Here, the target that has entered the process of being a digi-slave, can be exploited by means of the digital environment for many years with the use of medium, hard and soft discourses of this language and the potential surroundings required for this. This becomes so familiar that they may attempt to use his brain without any hesitation and even what he wrote publicly.

First of all, Psycho-Semiotic Language Use is performed entirely based on the psychological analysis of the person. Let's concretize by giving an example, the individual is exposed to a series of fictions that he comes across throughout the day, that affects him, that is, that has a reflection in him. Let's say this person keeps the negative events he comes across during the day in his computer or phone in the form of his personal diary, but while keeping it, he writes poems, lyrics and comments on whatever is happening in his country throughout the day. Suppose that these poems and similar lyrics are played through the digital media as song lyrics and bring high commercial fame and money; Consider that his comments have really an impressive power and there is a group that takes advantage of them: Such a person can be turned into an essential Digi-Slave for an establishment that can use this language. The current period of the world and the slave who has been paralyzed can pass away without even being able to express his right. If the fact that such a person will not be desolated seems inevitable, then it is also reasonable that he will be surrounded by Psycho-Semiotic Language Use to the same extent. It is also reasonable that what is necessary for this will be done because such a person is now at the mercy of this establishment. This establishment can change the method according to the characteristics of the target, while using everything you can think of, such as accessories, fragrances, etc. that affect the target psychologically, including gestures. If the target digi-slave is someone whose personal diary on his digital devices is constantly looted and used, the feeling and perception that he is constantly under surveillance can be sent to him through many channels throughout the day. If he mentions in his diary that the person in an incident that he was exposed to and was uncomfortable with was wearing a hooded sweater, this content now means that it will be included in the Psycho-Semiotic Language Use and will be used as an element of oppression from time to time. This complex period in the world history and the upsetting moral and value judgments where the person who holds the power is full of pride, the suggestions about what the digi-slave individual is able to do psychologically in order to survive may be the subject of another article. The fact that the players are able to come out personally and lead the opinion and lead in ensuring security in digital environments inevitably shows the necessity of blocking the road to become a digi-slave.

### **Raising Awareness and Proposed Solutions**

"It doesn't matter a door or a chimney for an experienced thief" (Çotuksöken, 1994: 248).

We can witness that some of our proverbs and the digital age reality exactly coincide. Some of us may have grown up saying "a thief is the one who is not called a thief," depending on the characteristics of the thief. It can be thought that both of them fit this transition period. (Will it ever transit?)

Will the people of the digital age just say "Oh God! Grant us what we hope for and make us secure from what we fear. Amen," in order to keep their hope? Or will they make an effort like Sisyphus to find solutions? Or will they try to protect themselves through joining the stealer system? Because they are the subject of survey questions that need to be asked in field research, in order to awaken the majority who are exposed to Psycho-Semiotic Language Use and who cannot understand this and to raise awareness, the topics that are listed in the article can be brought up for discussion and more striking solutions can be reached by means of this discussion.

1. The Digital Law field has to be established with a solid technological infrastructure in the near future. That should be equipped with an infallible intuitive artificial intelligence that not only solves current

everyday problems but also can foresee the technology of the future decades and deliver Digi-Law solutions. It should be able to bring about new solutions from the difficulties experienced in solving today's problems.

2. Psycho-Semiotic Language Use Experts, Psycho-Semiotic Linguists, Psycho-Semiotic Language Experts, perhaps will need to be specifically trained within Digi-Law, in other words, legal solutions that will make it easier to trace also digital trails and find a legal solution.
3. One of the Psycho-Semiotic Language Use levels may be Mobbing.
4. Digi-tracking agents: Professional areas such as Digi-Police, Digi-Inspector, should be formed. These professional groups should follow digital trails and virtual tracks just like the airline map and whenever the person starts using a digital device, whether connected to the net or not, and/or each time the risk of siphoning occurs, all his private information and discourses like the idioms he uses should be protected with Digi/Digital Law from beginning to end and the individual should be able to check this. It should not be used for advertising purposes and should work in real terms. Maybe, a solution will be found for this in the future by making use of the atmosphere.
5. Is it only an impossible dream to reconstruct digital environments on people who are trying to be good, true and beautiful by purifying them from the reign of all kinds of religion, language, race, ideology, and esoteric groups? People who belong to these groups should be prevented from despoiling the public and deriving moral and material benefits from it.
6. Interaction Law should also be formed in the area of Digital Law. This area should be divided into units of interaction degrees such as Interaction Law I, Interaction Law II and etc. and they should intervene when the words, phrases, and discourses published in the digital environments are transformed into moral and material commercial profit. Those who harass someone for these effective uses should be prevented by the digital legal system and a judicial process should be launched.
7. Linguistics courses can be scheduled in Communication Faculties. Thus, the formation of the perception that each language is based on one formula becomes easier. Those who know the quite mathematical formula quite will get it. In this way, the perception that the natural languages are indicators will become accustomed and this will naturally affect the form of thinking. Gaining a general view of all languages to the individual can create the thought that they can also be used as a design tool. This view will create a new perception, which can influence the way of thinking.
8. If Communication Faculties are transformed into the Faculty of Communication Design, this can contribute to change the point of view and to form a new perception on behalf of the vast majority and to the formation of a new thought. Communication is closely related to design in the reality of our age.
9. Moreover, these faculties can first make concrete decisions about digital media and digital devices, based on digital integrity and digital law, firstly related to their own attitudes and behaviors. Such as protecting faculty members against digital theft, ensuring no illegal transaction violating the law on the protection of personal data and the Big Data is being made in their pages and so on.
10. In order to protect the 21<sup>st</sup>-century people from being a digi-slave, the way the individual uses language, his syntax and use of words can be used as a characteristic attribute. Repetitions can even reveal the way of thinking. Even if these uses are stolen once or twice, it is still unlikely to become periodic, or we should say an intuitive artificial intelligence algorithm may be needed for this. An algorithm that can figure out from which brain an idea, software or syntax can originate, like deciphering a person's handwriting.
11. As an idea, view in different areas, language uses that will deeply shock, affect and catch large masses to be patented and belonging to a digi-slave are pulled from the digital media, an individual also should be able to hold unprecedented effective uses that belongs to him, that include an idea, that have a commercial effect, that will bring in moral and material gain and guarantee through law and such software can also be thought about. Individual Data aiming to protect the individual from Big Data. Individual Self Embezzlement law and Interaction Law can be considered as a solution, too.
12. A new definition for digital areas.
13. Linguistics courses can be scheduled in Faculties of Communication Design; thus, the formation of the perception that each language is already based on one (mathematical) formula and each of them is an indicator may occur and therefore the perception that they can be designed just like visuals can be formed.
14. Studies to make the formalizing feature of an article, especially the discourse of the state press-broadcasting-publication, is distinguishable.
15. In the future there can be personal digital transcripts for all digital products users to control their digital securities.
16. The final solution is to develop an education system aimed at establishing questioning and critical thinking starting with the mother language learning methodology in early childhood, before, during and after school.

17. The title of Psycho-Semiotic Language use as a complaint element should be added to the titles of the sponsored advertisement/advertisement tabs on the Digital Social Media Platforms that can be complained and blocked by the user. Prevention of attacks on people who are targeted (digi-slave) from digital social media platforms can be achieved by raising awareness of Psycho-Semiotic Language use.
18. World Psycho-Semiotic Language Use Awareness Day can be declared.
19. Just like the author of this article has already started, scientists may present books, panels, and conferences as a range and keep all these on the agenda.
20. TV channels/those who can easily access digital data and data theft should be restrained by urgent, high-sanctioned digital law which can be implemented immediately. These areas need to be blocked by means of digital law and innocent people must be protected. Otherwise, some evil organizations that can use the data mine (!), which they discovered as a great resource, as a common digi-slave with the dominant political power for a lifetime, may be allowed to grow and survive because such organizations will definitely cooperate with the sovereign power.

From now on, it's related with Psycho-Semiotic Language User that is totally belong to the of this article writer, too.

### **What is the psycho-Semiotic Usage Parser?**

1. A Psycho-Semiotic Language Parser that tracks, records and separates the digital traces that the individual left behind in digital environments. In this way, one will be able to differentiate and even measure the language uses, which can paralyze him with the evil Psycho-Semiotic Language Use about what he has written.
2. Psycho-Semiotic Language Parser with immediate penal sanctions approved by digi-law. If its measurement and assessment say that there is evil use, this determination will be processed and finalized instantly by digital law.
3. Advanced versions can also be designed: A complete Psycho-Semiotic Language Usage decoder.
4. Maybe, this century is the right time for legally deciphering the genetic-cultural habit that paralyzes this goal that evil interest-group entities have made for hundred of years and now transferred into digital environments and legalizing this process, what do you think?
5. In fact, looking at the profile should be included in this psycho-Semiotic Language Use and since its content should be capable of digi-tracking, moods such as 'what did he/she write,' 'who looked end when did he/she/foundation look,' 'how did this look feel in terms of Psycho-Semiotic Language Use' should also be presented in the reporting section.
6. In fact, looking at the profile should be included in this Psycho-Semiotic Language Use and since its content should be capable of digi-tracking, moods such as "what did he write", "who looked and when did he look", "how did this look feel in terms of Psycho-Semiotic Language Use" should also be presented in the reporting section.
7. A Psycho-Semiotic Language Parser that, tracks, records and separates the digital traces that the individual left behind in digital environments. In this this way, one will be able to differentiate even the measure the language uses which can paralyze him with the evil Pyscho-Semiotic Usage Language Use about what he has written.
8. Digital Trace Equipments/software (Transcripts) must work together with Psyscho-Semiotic Language Usage Parser
9. If there are people who attack the posts made by the individual on digital media in terms of Psycho-Semiotics, a Psycho-Semiotic Language Use Parser that can measure and evaluthe digital traces, that the individual left behind in digital environments ate this use Immediately.

### **Conclusion**

"Believe in your hopes, not your fears."

Marion Harper (Merter,2019:66)

"Believing in hopes" and working hard to achieve these hopes, of course! Considering the world history, the similar events that happened before the significant historical transition periods, the fact that those who hold the power and/or those who were attached to this power are able to form this oppression environment with fiction, plot, narrative strategies (definitions belonging to Ronald Barthes) in their own interests, the fact that they are able to exploit the law in line with their interests, that they can even suppress the person who has been transformed into a digi-slave from entering legal remedies, and that the possibility and reality that they can arrange this suppression process thanks to the narrative strategies can also affect the salvation process of the digi-slaves who have been trapped in this network and claiming and getting their rights back. Suppressing the victim with the psychological codes that have been analyzed in digital social media environments such as WhatsApp, ekşi Sözlük, telephone, SMS and tools and media such as e-message which are the simplest examples of how an interest group possessing an organization to paralyze the individual who has been transformed into a digi-slave,

in every sense -particularly if he tries to claim his rights-; using Psycho-Semiotic Language with the genetic and/or cultural codes existing in the society, making the victim inoperable and inoperable, striving to keep the victim in a stealable state, sustaining these actions for years can be analyzed as modeling samples a 'case' in the next article and/or book, or book chapter through legal consultation.

The odd thing is, since 21<sup>st</sup>-century human beings are designed as the "dwarf" consumer of the "supreme" capitalist society, they are wanted not to think to consume everything. An individual who gradually gets more distant from critical thinking may not even realize that he or she is transformed into a digi-slave. The majority of people may still consist of people who center human being. This may avoid them from believing that people can do anything for money. The idea of being looted from every environment may seem quite distant to them. However, those who hold the reins of the digital power in their hands may have the potential to not only use all these media illegally as data providers but also to use the brains that they have decoded as digi-slaves, in this period when the patent culture is rapidly arising.

In societies like us who still regard the state as a kind of protector (the benevolent state), think that it controls everything that reaches them, but are faced with the reality when something bad happens, especially in a totally capitalist period where the content providers who regard the public as a milky animal are getting mad about patent, does the individual whose outstanding profitability from digital environments except for the law on the protection of personal data and Big Data (which cannot be controlled by the public), is deciphered seem helpless and alone?

All this legal confusion has to do something with a new world order. Those who hold the digital power should be stopped from using this power in the interests of themselves and their stakeholders. Şule Çet and many similar cases.... Hardly a day passes without a new tweet series launched for establishing justice and this is named as the Twitter Chief Prosecutor's Office. (Twitter: Büyükler Gülsün (ComicanEvdeKal, 29 August 2020). Also the relationship between many incidents such as suicide, extortion, murder, etc., which are increasing in number day by day and the digital media thefts, should be investigated. Illegally collected information about victims who are somehow chosen may strengthen the hands of those who engage in such behavior. Digital media should not be the means to seek remedies for those who are exposed to digital media thefts.

The necessary responsibility must be assumed and this needs to be in a global scale. Otherwise, some biped ones may keep stealing looking in our faces.

Indeed, this is what I mean: The people of 21st-century digital media have to wake up against those who engorge from such media in order to protect their brain with due process of law (sound and independent law).

We must write everything universally so that the ratholes of the sneaky bipeds who may flout the rules we are likely to make are closed. We cannot even talk about digital media without being universal.

This will be the beginning of ending their capability to steal and destroy lives. We cannot say that people with such personalities are human anyway. They already prove that they are not human given half the chance.

In this way, pillaging this field with the printing, publishing, broadcasting, entertainment sector, TV, and cinema world which hold the digital platforms in their hands and politicians (it is obvious that this power is also needed and the political forces are fed from this environment, see: digi-track).

Most importantly, to prevent the evil use of academic environments with this knowledge.

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## When the Parent becomes the Teacher - Attitudes on Distance Learning in the Time of Corona-Teaching from Parents' Perspective

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### Abstract

This research paper's focus is to portray and analyse different ways of how participants of the educational system in the Republic of Croatia have reacted to the pandemic caused by the virus SARS-CoV-2. Pupils' right to education, as one of their basic rights, was enabled by the Government of the Republic of Croatia's decision to organise distance learning. The part of the system which encountered most challenges during transitioning to online education was in classes first to fourth due to the pupils, because of chronological age and digital and computer literacy level, requiring parents' assistance in order to successfully accomplish educational outcomes. The involvement of parents, who because of child's impossibility to independently carry out duties, have taken on a role of a substitute teacher overnight which consequentially resulted in their overload. The key element in distance learning is independence of pupils which is questionable in the chosen segment of the educational system. In addition to independence of pupils, this paper distinguishes two other important factors: pupils' spatial-material-technical learning conditions necessary to undertake distance learning and cooperative relationship between parents (as substitute teachers) and "real" teachers which takes on a new dimension in the newly emerged situation. The empirical research's goal was an inquiry into parents' attitudes and experiences in three categories (independence of pupils, spatial-material-technical conditions and teachers' requirements). Research results show the existence of difference in parents' attitudes considering their structural characteristics (age, sex, educational status). Furthermore, research participants show mostly positive feedback information in relation to general attributes of distance learning, and results confirm the existence of differences in attitudes in questioned categories. Based on research results we can conclude that distance learning asks of parents, whose children are pupils of classes first to fourth, for a new level of investment for which they require pedagogical support and guidance.

**Keywords:** distance learning, parent, pupil, *corona-teaching*

### Introductory observations

Thinking of all that the year 2020 will bring, surely no parent thought about schooling their child at home. However, the coronavirus pandemic changed the usual way of life and caused changes in economical, political, educational, social and domestic systems around the world. In the Republic of Croatia, Government of the RC promptly reacted in all spheres of its citizens' lives, including the field of education. Distance learning replaced contact-schooling on all educational levels by Republic of Croatia Ministry of science and education's decision placed on Friday 13<sup>th</sup> March 2020 (*Decision on the suspension of performing teaching in higher education institutions, secondary and primary schools, and regular work of institutions for preschool education; and establishment of distance learning*, [1]). Until then, this form of education was defined in *The act on education in primary and secondary schools* [2], applied only to pupils who due to chronic illnesses or major motor impairment cannot attend school. In their case, teaching can be implemented in the form of distance learning using means of electronic communication. The transition on schooling from home caused parents' a certain level of confusion and wrong interpretation of online schooling. Many of them started using the term 'home schooling' although it refers to schooling children at home by parents who have undertaken previous education and preparation. Namely, parents' involvement (in the extent of assistants and substitute teachers) in their children's online learning process is in fact schooling from home, not at home according to Car [3], and there are few significant indicators of

differentiation of the two terms to which the author unambiguously indicates. Contemporary understanding of the term ‘home schooling’ appears around the mid-60s of the last century according to Dadić as cited in Sever [4]. According to Ray as cited in Sever [4] most common reasons for home schooling are individualized programme or adjustment of content and environment for each pupil, in average the child achieving higher academic achievements than they would at school, reduced possibility of bullying amongst peers, and similar. Furthermore, better family relations stand out with generally safer environment for transfer of certain values, beliefs and worldviews onto children and youth. In Croatia, schooling from home, as previously mentioned, is defined as following classes at home for pupils who require it, that is, as one of temporary forms of education which is prescribed by the *Policy of primary and secondary school education of pupils with disabilities* [5]. However, there exists a possibility that this extraordinary situation triggers activism and activity with different participants and parties of different levels of the educational system, which would be based on lived out experiences of the pandemic and on research results of the field of schooling from home, to legalise this form of education in the Republic of Croatia.

Coronavirus pandemic has placed all pupils, along with their parents, in the comfortable setting of their home and made apparent the advantages and shortcomings of this form of education. The advantages and shortcomings are evident in all levels and in all directions. We distinguish three key elements for the named form of schooling at distance and our research problem. The first element is independence of pupils. One acknowledged definition describes independence of pupils as the ability to plan studying, oversee learning progress and value learning outcomes (Benson [6]). Pupils with no previous experience of distance learning had to, in a very short time, get used to schooling in such form, as opposed the usual going to school. Distance learning demanded a higher level of discipline and independence than participation in the "classic" classroom. Generally speaking, each new situation demands a corresponding set of competencies. Vrkić Dimić [7], as cited in OECD defines ‘competencies’ as a complex construct of different skills in four basic areas: cognitive competency (the use of theory and informal knowledge developed through practice), functional competency (ability within a specific area), personal competency (ability to choose appropriate behaviour depending on the individual’s situation), ethic competency (ability to morally act and choose based on developed personal and professional skills). Personal competency is of special importance, with the emphasis on the pupil's ability to adapt to distance learning which primarily mirrors in the independence of the pupil. Independent, autonomous pupil has the ability to take on the responsibility for their education. It's the independence in learning that is one of the key goals in education, as today's job market continuously seeks for new skillsets. However, this ability develops particularly in higher education levels, which is why expectations of pupils of younger age need to be adjusted (Sam, [8]).

Spatial-material-technical conditions of the family i.e. household the pupil lives in also contribute to the development of the independence of the pupil. Unless the necessary conditions for pupils’ participation in schooling are ensured in the household of the pupil, it creates an unequal divide in educational opportunities. The field of education is directed towards providing equal opportunities and preventing the development of privileged individuals or groups in the process of acquiring competencies. Appropriate conditions for online schooling have most surely not been available in all households, therefore we can conclude that in the suddenly caused pandemic situation not all pupils were provided with equal opportunities to accomplish planned educational outcomes.

Appropriate, active methods of teaching pupils, which is one of the essentials of modern education, can only be accomplished in spatial-material-technically organised and pedagogically formed environment in which the education process takes place (Čale, [9]). Unfortunately, the situation in which the pupils found themselves in “overnight” doesn't imply every household being equipped with special “equipment”. In addition, neither all teachers didn't have or don't have the necessary level of digital competency, which causes an additional problem in the distance learning process. This led to recorded cases of teachers developing tasks whilst not considering the technological and computer abilities of pupils. Furthermore, some pupils participated in online learning via computer, tablet or laptop, while others followed the classes over smartphones, which is certainly not an appropriate way. The pandemic situation demanded instant decisions which were unable to be thoroughly thought through, and the lack of the same was only apparent as time passed.

As the third key element in this paper we distinguish the cooperation between the parent and the teacher as one of the most important aspects of distance learning. According to Eurostat's research from 2019, Croatia is one of the leading European Union countries in digital competencies amongst youth (16 - 24 years) according to (Eurostat, [10]). However, our research focus was on a younger population (classes first to fourth) where it's difficult to expect a pupil to independently performs all tasks. Since the teacher cannot fully customize teaching, the parent becomes a substitute teacher partially taking over their functions, thought which this cooperation takes on a new dimension. The partnership between the school and the family is for the purpose of securing positive educational and social development outcomes for children (Ellis & Hughes [11]). The cooperation used to be a choice of the

parent, whilst in the newly emerged situation it became a necessity. The passive role of the parent in relation to the school is grounded in the belief that it is primarily the school that is responsible for child's educational outcomes and that parents only need to act upon school's request (Hoover-Dempsey & Sandler [12]). However, different research show that coordination between the parent and the teacher has a positive impact on the social and emotional development of children (Zins et al. [13]). Parents have never yet been obliged to take on such a role in education, whereas now they communicate with teachers daily in assisting their children to comprehend learning materials. Communication and appropriate responsibility distribution between the family and the school is utmost important in the family - school partnership. It is of great importance that schools seek parents' help in solving potential problems relating to their children and are familiarised with parents' expectations (Škutor [14]). Related research indicate that parents' and teachers' fears are sometimes mirrored and sometimes complementary, and can be narrowed down to a few complementary cores: self-identity, educational power, educational project, sense of responsibility and/or guilt, and principles and values (Kolak [15]). Bearing this in mind, we approached this research that aims to discover experiences of undertaking distance learning from the perspective of parents of pupils of classes first to fourth.

**Empirical research methodology**

The research aim was an inquiry into distance learning experiences from the parents' perspective. Specific variables of distance learning examined in this research are:

- independence of pupils
- competencies of teachers
- spatial-material-technical conditions and communicational prerequisites in the family home

The first part of the research focuses on general attributes of distance learning in the named areas, while the second part focuses on determining differences in parents' attitudes considering age, sex and educational status.

First research question aims to determine participants' attitudes direction and is set in a form of a hypothesis.

H1.1. Parents' attitudes on distance learning in the times of COVID-19 pandemic related to independence of pupils are mostly of positive direction.

H1.2. Parents' attitudes on distance learning in the times of COVID-19 pandemic related to virtual teacher's requirements are mostly of positive direction.

H1.3. Parents' attitudes on distance learning in the times of COVID-19 pandemic related to spatial-material-technical conditions are mostly of positive direction.

Second research question aims to determine differences in parent's attitudes considering different parent's attributes and it is structured through three subhypothesis.

H2.1. Parents' attitudes differ considering parents' sex.

H2.2. Parents' attitudes differ considering parents' age.

H2.3. Parents' attitudes differ considering parents' educational status.

The contingent variable consists of parents' attitudes regarding distance learning grouped in three categories (independence of pupils, teacher requirements and spatial-material-technical working conditions), whilst the independent variable consists of individual research participants' attributes: sex, age and educational status.

The research methodology is quantitative and the instrument is a questionnaire. This instrument showed most suitable as the data source were research participants (parents) as individuals and their personal statement on beliefs, attitudes and behaviour (Pikić [16]). An online data gathering was the most optimal solution in the newly emerged situation, also chosen for its practicality and possibility to question a larger sample in a relatively short period through different regions of the Republic of Croatia.

**Research sample and sample's structural attributes**

The research was conducted over 10,545 participants from the Republic of Croatia, and during sample collection an unintentional convenient sample was used, based on the availability of parents. It was conducted via an online questionnaire, which was for the purpose of this research created in Google Docs Forms.

Research participants are parents of pupils of classes first to fourth who received the questionnaire through professional associates pedagogists and class teachers - teachers of classes first to fourth, through the virtual classroom.

**Table 1: Sample's structural attributes**

Sex	N	%	Parents' educational status	N	%
Female	9287	88,1	Primary school	774	7,3

Male	1258	11,9	Secondary school	5543	52,6
Total	10545	100,0	BA	1311	12,4
<b>Age</b>	<b>N</b>	<b>%</b>	MA	1975	18,7
< 30	777	7,4	MA/MR.	747	7,1
31-40	6246	59,2	MSc	116	1,1
41-50	3346	31,7	DSc/PhD/EdD	79	,7
51 >	176	1,7	Total	10545	100,0
Total	10545	100,0			

Even the quantitative data from *Table 1* and research sample of 10545 participants already points to the conclusion of the importance of the research subject to parents, which is demonstrated by their willingness to participate in sharing experiences related to the newly emerged situation. The uneven ratio of mothers (88%) and fathers (12%) contingently indicate a bigger involvement of mothers in child's distance education. Although today fathers more commonly take on bigger roles in children's upbringing (alongside the role of providing for the family) generally spending more time with them than in the past (Lamb & Tamis-Lemonda [17]), this research confirms higher percentage of mothers involved in children's upbringing. Pavao Brajša [18] had already in 1995. in his book “*Fathers, where are you?*” polemized on the problem of the lack of presence of fathers in upbringing, and this research shows that distance learning is not an exception either.

Majority of parents, 59,2% of them, belong to the age group between 31 and 40 years old. Following represented age group is between 41 and 50 years old and consists of 31,7% of the tested sample. There are significantly fewer parents younger than 30 represented by 7,4%, and least represented are parents older than 51 (1,7%). It shows that individuals more regularly postpone taking on the role of the parent to a more mature age, which is in correspondence with other research (Kušević [19]). Regarding educational level, a relatively small number, 7.3% of participants, have finished primary school; the majority (52.6%) of them completed secondary school; 18,7% are undergraduates; while 12,4% are graduates. There are 7,1% with MA/MR level, 1,1% of Master of Science (MSc), and least represented with post-graduate level (DSc/PhD/EdD) with 0,7%.

### Data processing methods

Gathered data acquired through this research was analysed by the corresponding quantitative analysis procedures and processed with the Statistical Package for Social Sciences (SPSS). The results and basic features of the sample and distance learning are presented by descriptive statistics parameters (arithmetic mean and standard deviation), while T-test and Welch analysis of variance (ANOVA) were conducted in identifying differences related to participants' structural features, along with Post Hoc Games-Howell test depending on the independent variable type.

### Research results and interpretation

Answering the first research question, based on research participants' experience and their feedback information, the goal was to obtain insight into their attitudes on distance learning.

#### Parents' attitudes direction

Research participants' experiences are divided into three categories: independence of pupils, teacher requirements, and spatial, technical and communicational prerequisites.

**Table 2: Descriptive indicators of parents' attitudes on distance learning**

<b>PUPILS' INDEPENDANCE (Min= 1/no, Max= 2/yes)</b>	<b>M</b>	<b>SD</b>
My child knows how to turn on a computer/laptop and join the virtual classroom.	1,74	,44
My child knows how to find learning e-materials.	1,63	,48
My child independently uses e-tools for communication with other pupils.	1,48	,50
My child independently uses e-tools to find content that additionally explains what they did in the virtual classroom.	1,46	,50

<b>TEACHERS' REQUIREMENTS (Min=1, Max=5)</b>	M	SD
My child is enabled interaction with the teacher when they find something unclear.	4,24	1,20
Teacher's feedback information is regular and prompt.	4,63	,82
Teacher's feedback information is motivating to the pupil.	4,50	,91
Teacher customizes tasks to the individual capabilities of my child.	3,70	1,41
Teacher implements activities that encourage communication amongst pupils.	3,42	1,47
<b>SPATIAL-TECHNICAL AND COMMUNICATIONAL PREREQUISITES (Min=1, Max=5)</b>	M	SD
Teacher's requirements from my child don't require parent engagement.	2,78	1,26
I often find teacher's instructions unclear.	1,98	1,37
We do not have adequate spatial working conditions.	1,98	1,31
We do not have adequate technical working conditions (computer, TV, internet).	1,75	1,25

Based on descriptive parameters (Table 2) of parents' attitudes on the independence of pupils we can conclude that parents mostly consider their children to be independent. They rate their children most independent in their capacity to turn on the computer and join the virtual classroom on their own (M 1,74) while rating independent use of e-tools for additional clarification of learning material as the area that the children are least independent in (M 1,46). Thus, the first hypothesis (H1.1) "Parents' attitudes on distance learning in the times of COVID-19 pandemic related to independence of pupils are mostly of positive direction" is accepted.

Parents generally have a positive attitude about the requirements of the virtual teacher, where they've rated regularity and promptness of feedback as most positive (M 4,63) while being least satisfied with the implementation of activities that should encourage communication amongst pupils (M 3,42). Therefore, the second hypothesis (H1.2) "Parents' attitudes on distance learning in the times of COVID-19 pandemic related to virtual teacher's requirements are mostly of positive direction" is also accepted.

Parents are also satisfied with the spatial-technical and communicational prerequisites aspect of distance learning, with highest evaluation on adequate technical working conditions (M 4,25). In this aspect, they are significantly less satisfied with teacher requirements which don't require their engagement (M 3,22) but it's still not a general satisfaction. Third hypothesis (H1.3) "Parents' attitudes on distance learning in the times of COVID-19 pandemic related to spatial-material-technical conditions are mostly of positive direction" is also accepted due to research participants indicating more positive than negative direction.

Summing up the interpretation of answering the first research question, we can conclude that parents' attitudes are positive in all aspects of spatial-technical and communicational prerequisites.

### Differences in parent's attitudes considering different parent's attributes

As an answer to the second research question in the empirical section of the paper, differences are determined in parents' attitudes considering different parent attributes. When enquiring into differences in attitudes considering the sample's structural attributes, firstly conducted were global analyses on composite variables: independence of pupils, competencies of teachers, and spatial-technical-material and communicational prerequisites. Afterwards, T-tests were conducted on the sex variable and Welch analysis of variance with Post Hoc tests for each composite variable, while more detailed differences were specified with same tests through individual features grouped by inquired aspects of distance learning.

**Table 3: Basic descriptive parameters and differences considering participant's sex**

		Basic descriptive parameters		Levene Test equality of variance		t-test	
		M	N	F	Stat. significance	t	p
<b>Independence of pupils</b> (Min=1, Max=2)	F	1,58	9287	1,122	,290	-,956	,339
	M	1,59	1258			-,949	,343
<b>Competencies of teachers</b> (Min=1, Max=5)	F	4,13	9287	38,652	,000	8,789	,000
	M	3,89	1258			8,072	,000***
<b>Spatial-technical and communicational prerequisites</b> (Min=1, Max=5)	F	1,95	9287	5,978	,015	-9,090	,000
	M	2,18	1258			-8,827	,000***

\*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$

According to t-test results in Table 3, it is established that fathers evaluate independence of pupils in distance learning equally as mothers. On the other hand, mothers estimate teachers' competencies significantly higher than fathers ( $p < 0.001$ ), who then evaluate spatial-technical and communicational prerequisites of distance learning significantly lower than mothers ( $p < 0.001$ ).

Even though a high evaluation of teachers' work is established in both sexes, mothers evaluate adjustment to work and organisation of distance learning and quality of teachers' feedback significantly higher ( $p < 0.001$ ). Research results indicate that teachers' directions are more often unclear to fathers than to mothers ( $p < 0.001$ ) and that fathers evaluate their spatial and technical working conditions significantly lower than mothers ( $p < 0.001$ ). The first hypothesis (H2.1.) is accepted as it indicates differences in parents' attitudes considering parent's sex.

The second hypothesis in the second research question is aimed at determining differences considering the age of the parent. Table 4 shows basic descriptive parameters grouped by participants' age and differences established through Welch analysis of variance (ANOVA).

**Table 4: Basic descriptive parameters and Welch analysis of variance considering the age of the participant**

		N	M	Stand. deviation	Welch F	p
<b>Independence of pupils</b> (Min=1, Max=2)	< 30	777	1,53	,41	13,73***	0,000
	31-40	6246	1,57	,39		
	41-50	3346	1,61	,39		
	51 >	176	1,66	,39		
	Total	10545	1,58	,39		
<b>Competencies of teachers</b> (Min=1, Max=5)	< 30	777	4,31	,84	31,68***	0,000
	31-40	6246	4,13	,85		
	41-50	3346	4,00	,88		
	51 >	176	3,99	,97		
	Total	10545	4,09	,86		
<b>Spatial-technical and communicational prerequisites</b> (Min=1, Max=5)	< 30	777	2,01	,83	2,72*	0,04
	31-40	6246	1,98	,83		
	41-50	3346	1,97	,82		
	51 >	176	2,16	,96		
	Total	10545	1,98	,83		

\*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$

Variance analysis confirms differences in all composite variables, so therefore Games-Howell Post Hoc test was undertaken to establish differences between each parent category. This established that younger parents (up to 30 and 31-40) evaluate their children's ICT competencies significantly lower than older parents (41-50 and 51+). Parents up to the age of 30 evaluate their children's ICT competencies significantly lower than the group 31-40.

Younger parents (up to 30) evaluate competencies of teachers significantly higher than other groups. A trend is noted where the higher the age of the participant, the lower the satisfaction of teacher's work, with equal evaluations found amongst groups 41-50 and 50+. At the same time, younger parents (up to 30) consider teachers' interaction with the children of more quality than other age groups, even though they encounter problems in interpreting teachers' instruction more often than older parents (31-40 and 41-50). Accordingly, they evaluate that teachers create more customized teaching according to pupils' capabilities and they motivate the pupils to work.

Category of evaluating the spatial-technical and communicational teaching prerequisites is the only which determines differences between parents aged 41-50 and 51+, where 51+ evaluate their capabilities significantly lower ( $p < 0.05$ ). This primarily relates to adequate technical work environment of the TV, computer and internet. Based on the results insight, the second hypothesis (H2.2.) is accepted which shows differences in parents' attitudes considering their age.

During determining differences relating to the third proposed hypothesis considering research participants' educational status, Welch one-way analysis of variance (ANOVA) was conducted and is shown in Table 5 as basic descriptive parameters on composite variables.

**Table 5: Basic descriptive parameters and Welch analysis of variance considering participant's educational status**

		N	M	Stand. deviation	Welch F	p
<b>Independence of pupils</b> (Min=1, Max=2)	Primary S.	774	1,63	,38	18,59***	0,000
	Secondary S.	5543	1,61	,39		
	BA	1311	1,54	,39		
	MA	1975	1,52	,40		
	MA/MR.	747	1,52	,39		
	MSc	116	1,59	,38		
	DSc/PhD/EdD	79	1,53	,39		
	Total	10545	1,57	,39		
<b>Competencies of teachers</b> (Min=1, Max=5)	Primary S.	774	4,34	,77	73,9***	0,000
	Secondary S.	5543	4,21	,83		
	BA	1311	3,99	,85		
	MA	1975	3,91	,86		
	MA/MR.	747	3,73	,95		
	MSc	116	3,71	,91		
	DSc/PhD/EdD	79	3,68	,92		
	Total	10545	4,09	,86		
<b>Spatial-technical and communicational prerequisites</b> (Min=1, Max=5)	Primary S.	774	2,20	,90	23,04***	0,000
	Secondary S.	5543	2,02	,85		
	BA	1311	1,98	,81		
	MA	1975	1,84	,75		
	MA/MR.	747	1,87	,76		
	MSc	116	1,94	,80		
	DSc/PhD/EdD	79	1,78	,72		
	Total	10545	1,98	,83		

\*\*\*  $p < 0.001$ , \*\*  $p < 0.01$ , \*  $p < 0.05$

Variance analysis determines differences in all composite variables after which Post Hoc tests were undertaken to determine differences between each parent category. On the independence of pupils variable, Games-Howell test determines differences primarily between primary school and others (BA, MA, MA/MR) where it indicates that primary school graduates evaluate independence of pupils in distance learning higher ( $p < 0.001$ ). Secondary school graduates show similar results, also evaluating independence of pupils significantly higher (than BA, MA, MA/MR) ( $p < 0.001$ ).

In evaluating competencies of teachers, ergo how teachers have circumstantially adapted to distance learning, significant statistical differences are determined amongst almost all groups of parents on high statistical importance levels ( $p < 0.01$  and  $p < 0.001$ ). Same differences show in an almost perfect linear trend, where parents' with higher educational level take on a more critical attitude towards the teachers' work in online learning. Those differences only do not show as significant between parents with an MA and those with higher levels of education.

As in evaluation of competencies of teachers, the same trend amongst participants is determined in evaluating spatial-technical and communicational teaching prerequisites, where parents with lower levels of education evaluate their prerequisites for distance learning lower than parents with higher levels of education.

The specific results of composite variables determine that parents graduates of primary and secondary schools evaluate that their children know how to access the virtual classroom and find study materials more frequently than other parents. Also, in all inquired aspect of independence of pupils, it's determined that parents with lower education levels (primary and secondary school) mostly give higher evaluation than other parents.

Parents graduates of primary and secondary schools more frequently have problems in understanding learning materials and interpreting teachers' tasks. However, they consider the teachers' interaction with pupils to be of more quality than other parents and are more aware of how teachers customize tasks depending on the pupil's capabilities than parents with higher educational levels.

Parents graduates of primary schools evaluate their spatial working conditions lowest, where a global difference is determined between parents of lower (primary, secondary school, BA) and higher levels of education, who are more satisfied with their working conditions. The same applies to technical conditions which are learning through means of TV, computer or the internet connection.

Based on results insight and data interpretation, the third hypothesis of this research is accepted (H2.3) which determines differences considering parents' educational status.

### **Discussion and final observations**

As a subject of professional and scientific discussions of numerous pedagogical workers, as well as of all interested groups, positive and negative aspects of distance learning appears as a reoccurring topic. Although it was expected for technology to grow into becoming a part of the schooling process, the current pandemic has conditioned distance learning to become the only possible form of operating the educational system overnight. Tasks and goals of parenthood vary depending on social context and historical setting we find ourselves in, and with it follow changes in parent's expectations (Ljubetić [20]). At this moment, parent's expectations are higher due to parents' involvement in the education of their child no longer being a choice, but a necessity and duty.

The key element of distance learning is independence of pupils which is questionable in the chosen segment of the educational system considering the chronological age of pupils. Alongside pupils' independence in working, we distinguish two other important factors: pupils' spatial-material-technical learning conditions necessary to implement distance learning, and cooperative relationship between parents (as substitute teachers) and "real" teachers which in the newly emerged situation takes on a new dimension.

As a part of broader research this paper addresses various challenges parents were facing during the COVID-19 pandemic related to parents' attitudes and experiences of schooling their child at home. This research shows that parents are mostly satisfied with how teachers managed this format of teaching and feedback to them and their children. On the other side, some other studies (e.g. Wildemann & Hosenfeld [21], as cited in Federkeil, Heinschke, Jungmann & Klapproth, [22]) have shown that many parents experienced unstructured task transmission by teachers and a lack of teacher feedback. In secondary schools and higher classes of primary schools there are many different teaching approaches and therefore is impossible to give general statements regarding teaching quality in this circumstances.

Regarding parental relations and inclusion, mothers are more content than fathers regarding teachers' performance, as well as in the segment of spatial-material-technical conditions. In other findings (Kolak, Markić & Horvat [23]) of this research study it is shown that most parents (80%) are highly involved in teaching and learning during school lockdown, where mothers are more involved and they feel more competent than fathers at managing school tasks. Furthermore, 32% of the parents are unable to look after lessons and tasks that teachers provide, whereas 35% are exhausted, stressed, and consequently postponing their household chores. Findings of Association *Parental Together* [24] have also confirmed that 80% of mothers feel more involved than fathers at educating their children at home.

Considering the education status, a higher level of education proportionally shows a higher level of expectations from the teacher, along with the satisfaction of spatial-material-technical conditions. Evaluation of independence of pupils is inversely proportional to the educational status, where parents with lower educational status tend to define their child as more independent than parents of higher educational status. In broader context of this study it is shown that parents with lower level of education more often have problems with helping their children at various tasks and demands of distance learning [23], which is presumably related with the socioeconomic status as omnipresent variable that affects children's school achievement.

Considering participants' age, parents' aged up to 30 evaluate teacher's competencies significantly higher than other groups, and it can be noted that an increasing participants' age reduces satisfaction with teachers' performance. On contrary, regarding ICT competencies of their children (independence of pupils), younger parents (up to 40) evaluate their children's competencies significantly lower than older parents (41+), who more often have problems with modern technologies. Although teaching during COVID-19 pandemic and ongoing challenges was stressful and burdensome (Eickelmann & Drossel, [25]), teachers' perspective was not addressed in this research. Regarding the age variable it is also well known that older teachers have more issues related to online teaching and they are also parents with needs to manage their homes and family. Stressors outside of workplace can also be significant when teachers have to use technology for which they do not feel competent enough and they can be related to socio-demographic factors or coping strategies (Federkeil, Heinschke, Jungmann & Klapproth, [22]). Therefore, UNESCO provided the list of educational applications, platforms and resources to help parents, teachers, schools

and school administrators facilitate student learning and provide social care and interaction during periods of school closure on their website.

Franklin D. Roosevelt, a president of the United States of America in a time of a great economic crisis, said: “We cannot always build a future for our youth, but we can always build our youth for the future.” In this unpredictable time of the pandemic, a similar idea can be our guiding inspiration. For some of the pedagogical obstacles which emerged out of the newly emerged crisis, the subjects of the educational process will not have influence over, but a collaborative and cooperative relationship between parents and teachers will certainly be the best guide towards ensuring the best conditions for competencies development of each child. According to data acquired in this study and many recent studies (Sablić, Škugor & Klasnić [26], [21], [22], [24], [25],) on education during COVID-19 pandemic there is evident need for further research, with combination of quantitative and qualitative methodology in order to help in organising teaching in future or identical pedagogical situations, providing guidelines for educational politics development, and support for teachers, parents and pupils.

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## Women's View of Humor: Gülse Birsal's 'Jet Society' TV Series

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### Abstract

The act of laughing, which is thought to be related with the body rather than the mind and identified with rudeness, has been attributed to outcast segments of society, such as women, children, slaves, or the common-people, while humor requiring supremacy of the mind is believed to be associated with the ruling elite class of society, and mostly with men. There is a judgment that humor can only be produced by men and that women do not understand humor and that they lack a creative sense of humor and perception, and it has become established that women can only be the laughing party, though not always. Crawford and Gressley (1991) also criticize numerous experimental studies in which women are called an inadequate group with neither the ability to create humor nor the sense of humor necessary to appreciate it. Furthermore, it has been observed that humor is constructed with a masculine language (Sanders, 2019, p. 211), and that humor is structured in a way that strengthens negative stereotypes about women and other disadvantaged groups (Lovaglia et al, 2008). However, humor offers an important area of freedom to question the dominant structures, to shake them, and to show resistance to the power/dominant elements. Many philosophers from Bergson to Bakhtin emphasize the relationship with power as a field of resistance while defining the field of laughter and humor. The most important references to humor, from a feminist perspective, are related to the nature of humor that challenges dominant ideological discourses. This paper focuses on Gülse Birsal as a sitcom writer in terms of the changing woman-humor relationship alongside social change in Turkey. When we scrutinize women over a wide time frame from a cartoonist in the comic magazines of the late 1980s to today's female stand up comics who create critical humor, it can be asserted that Gülse Birsal's sitcoms may represent a significant turning point in Turkey concerning women's relationship with humor. We can assert that Gülse Birsal's television sitcom may represent a significant turning point in Turkey concerning women's relationship with humor. Birsal critically discusses the stereotypes and positions of men and women, as well as the sitcom series, where the critical approach to class distinction and a rich-poor dichotomy becomes apparent. Within this context, we can say that although Gülse Birsal's humor is a part of popular culture, she produces a critical discourse which has a strong influence in terms of reaching a wide range of audiences. Although Gülse Birsal's humor benefits from stereotypes, which are shaken by Crawford (1991), it can be said that it has a structure that weakens negative associations and provides an environment conducive to evaluating gender stereotypes in an egalitarian and fair manner outside the restrictive context of gender stereotypes. Within this context, the narrative structure in the 'Jet Society' TV series will be examined using a method of critical discourse analysis through the generic characteristics and type of the sitcom.

**Keywords:** Women, Humor, Power, Sitcom, Gülse Birsal

### Introduction

*"It is a very serious thing to be a funny woman"*  
*Frances Miriam Berry Witcher (1814-1852)*

Historically, humor has been associated with the ruling elite class and men, as in many fields. The judgment that humor can only be produced by men, that women do not understand humor, that they lack a creative sense of humor, and that they can only be the laughing party, but not always, has been an established impression in many different cultures for a long time. Women have been excluded from the comedy field and, until recently, they have been kept away from different areas of humor, such as cartoons. In fact, according to Kotthoff (2006, p.5), "Authors such as Schopenhauer, Bergson, and Freud reinforced the exclusion of women from the comic arena." Crawford and Gressley (1991) also criticize numerous experimental studies in which women are described as an inadequate group neither having the ability to create humor nor having the sense of humor necessary to appreciate it. Additionally, it has been observed that humor is constructed with a masculine language (Sanders, 2019, p.211) and that humor is structured in a way that reinforces negative stereotypes about women and other disadvantaged groups (Lovaglia et al, 2008). However, humor offers an important area of freedom to question the dominant structures, to shake them, and to show resistance to the power/dominant one.

Being able to make people laugh through humor requires good communication skills and a practical understanding and evaluation of emotional and intellectual processes. This shows that humor is a product of intelligence used proficiently. Within this context, humor makes it easier to be loved by individuals and even by the masses, to be accepted faster in society and to be preferred in any environment. Humor also has a power that threatens authority to the extent that it facilitates a social acceptance of the person and brings the person to the forefront. Such a power, which loosens, destroys, and reshapes the rules of the established order and gives authority to individuals. Therefore, humor has been constrained by organizers throughout history. When we look at history, together with the patriarchal cultural order, situations such as aggression, violence, and war were associated with the male gender, and women were considered to be associated with passive domestic work. In this direction, humor, which includes meanings such as intelligence, aggression, and power, has carried the traces of a gendered approach throughout history and has been shaped within this framework. The masculine understanding that tries to keep women away from the field of humor and, therefore, from power has further made them the subject of humor, and the judgment that women do not understand humor, which is related to intelligence and mentality, has become established. However, just as humor can transform meaning, it is capable of dissolving and distributing culturally determined patterns with the same power. In this respect, humor is one of the most important tools that will enable women, who resist the patriarchal cultural order, to accelerate social transformation. Humor, which has been shaped over gender identities in the historical process, has the power to be used to demolish the negative relationships between genders and their stereotypes, as Crawford expresses (1991).

As an important conveyor of popular culture, the sitcom is an area where different social segments and discourses are represented, perhaps more than in other television productions. Within this context, sitcoms are texts that, by their nature, allow dissident and critical discourse to be seen and to follow up the struggle being waged through such discourse. Although it is domestic in this context, it can be asserted that sitcoms have been transformed into a field where women produce their opposing discourses within the historical development of sitcoms.

This article will focus on women writer and actor Gülse Bırsel within the framework of differentiated women-humor relationships parallel to social change in Turkey. When we scrutinize women within a lengthy time frame, as a cartoonist in the comic magazines of the late 1980s to today's women standup comics who create critical humor, it can be asserted that Gülse Bırsel's sitcoms may represent a significant turning point in Turkey regarding women's relationships with humor. The sitcoms Gülse Bırsel, who has reached a wide audience since 2004, wrote and acted in on TV (*European Side, Fake World, and Jet Society*) witness social change in Turkey and also become a catalyst for social change with the humor she creates. In this study, within the framework of the relationship between women and humor, Gülse Bırsel's sitcom series 'Jet Society' will be analyzed and, as a female writer, the arena opened by Bırsel in the field of popular culture will be expressed and the critical discourse she has produced, even though it is a part of popular culture, will be revealed.

In the study, based on the critical discourse analysis method of the theorist Van Dijk (2001), who reveals the connection between the concept of discourse with ideology, the scenario, plot, and characters of the 'Jet Society' series will be analyzed. The discourse analysis model of Van Dijk, which is handled in the context of macro and microstructure, is based on the interaction of a group of academicians at the University of Amsterdam in the early 1990s. The theory and method that Dijk brought forward, together with Kress, vanLeeuwen, Fairclough, and Wodak with their differences, did not progress through a single pattern. Discourse analysis is an analytical technique that develops with different disciplines, such as psychology, sociology, philosophy, and linguistics, and which benefits from the theoretical perspectives of these different disciplines. Discourse analysis is the study of language in its simplest form. However, as Dijk states, discourse analysis not only deals with the formal (phonological or syntactic) aspect of language use, but rather turns the focus of attention on social events created by language users who communicate in social and cultural contexts (cited in Çelik & Ekşi, 2008, p.105). Critical discourse analysis focuses on social problems, because social structure and culture are established through discourse (Fairclough & Wodak, 1997, p. 273-280). Power relationships are part of discourse and discourse proceeds ideologically. According to Pradeep (2019, p.1248), "*Critical Discourse Analysis (CDA) is a more specific type of qualitative textual analysis, precisely to investigate the hidden dimensions of ideology, power relations existing in social practice and power discourse in the narrative text*". Critical Discourse Analysis (CDA) is both a theory and a method (Fairclough, 2001, p.121). In the 'Jet Society' series, the focus will be on the analysis of characters and dialogues in the macrostructure, theme, plot, and social background, and the analysis of characters and dialogues in the microstructure, and making sound/music with visual arrangement. While the macro and microstructure of the 'Jet Society' series are analyzed from this perspective in these mobile applications, the latent power of humor in deciphering social defects, and the creative potential that makes defects visible, will be revealed. Female characters have a special place in the humor created by Gülse Bırsel. Emphasis will be placed on female characters that reveal the dynamic of social change in female characters. The scenes and dialogues were selected within the scope of non-probabilistic sampling in line with the structure of this study and were analyzed as to what extent they met our argument.

## Humor and Women

From ancient times until today humor is an area on which many philosophers have produced ideas. Humor is often associated with the demonic (Baudelaire, 1997, p.15), especially due to its distorting nature. Since the causes of laughter play an important role in losing control, such an understanding was established in the Middle Ages. Humor, along with the dissolution it brings with it, reveals a relief that can disrupt cultural patterns and rules. Eagleton also mentions that the construction of social reality is a strenuous task that requires constant effort and says that there is a darker sarcastic subtext beneath this rational reality (2019, p.26). Sanders (2019) talks about the lightness that laughter creates in people. In this case lightness has the power to take people far from reality. Humor gives people the chance to escape from the established order, as well as to change this order. Bahktin says that laughter can never be used by violence and authority (2001, p.110). This situation brings the triumph of laughter over fear. Together with this victory, a person can have a different perspective on life, even for a short time. It can add new meaning to life in a free space away from the pressure of authority and rules. This is the power that empowers individuals to change and transform the world, and which has affected the progress of the approach to laughter and prohibition thereof throughout history. A new understanding that reshapes ideas, changes meaning, and explains people to people from another perspective, prevails in this field. This is the point where the clash of humor with authority starts. Wherever humor exists, every individual is free to create a personal semantic world and make his own laws. Features such as freedom, sovereignty, and the superiority of reason provided by humor have also caused it to experience a break that corresponds to a class distinction in the historical process. Sanders reports that this distinction is visible, especially with the Renaissance (2019, p.275). While the act of laughter which is related to impulses rather than reason and evokes rudeness is attributed to outcast individuals in society, such as women, children, slaves, or of low degrees, humor, which requires the supremacy of reason, is associated with a ruling elite class. In line with this context, the cultural understanding that keeps women out of society has determined the direction in which humor will be shaped by putting humor to the use of an elite class consisting of men. For this reason, humor, which brings intelligence to the forefront and is built with a masculine language depending on gender stereotypes, is an important area of resistance for women to break down the stereotypes in the field of gender.

The approach to address the creation of an unequal order, based on male dominance from a feminist perspective, is extremely important in highlighting the gender-based power struggle concealed behind several definitions taken for granted in society. This gender-based struggle has been emotionally and intellectually shaped over two divisions of labor; while the world of dreams and emotions is left to women, rational and scientific thinking remained under the control of men. When considered from this point of view, it is no coincidence that the blue color of the seas, which constitute three-quarters of the earth's surface, symbolizes men, and the pink color of dreams symbolizes women (Atay, 2019, p.23). While this division has its direct effect of keeping women away from education and science, it has indirectly penetrated all social fabric. From this point of view, it is possible to see the reflection of a hierarchical gender relationship, directly or indirectly, at every stage of human relations within the patriarchal cultural order.

Throughout history, both men and women have been excluded from the social sphere due to a number of reasons, including their class, religion, and race. However, it can be seen that no male has been excluded solely because of his gender (Berkay, 2003, p.21). Cemal Bali Akal states that the need to preserve superiority over the reproductive gender also creates a strong fear of women, which turns into half-open, half-hidden misogyny (1994, p.13). Practices, such as the witch hunts that took place between 1450 and 1750 that tried to bring the female body, labor, and reproductive abilities under state control (Federici, 2012, p.243) can be considered as an extension of this misogyny. We see that the female/male relationship is an undisputed political power relationship, such as between the manager and the managed, when we consider the issue in line with the historical struggle. In the patriarchal cultural structuring, starting with the transition to plough farming, men became the owners of both the fields and women (Atay, 2019, p.36). Being female, which is a biological condition, undergoes a social transformation like being a woman in this social order, and women are taught to be passive through education and supervision (Akal, 1994, p.95). In this respect, when we look at studies in the field of humor, we can understand the reasons why women participate less in humor than men, and sociologists find the reason for this situation not in women's understanding of humor, but in the masculine understanding that shapes women with a more passive role compared to men (Sanders, 2019, p.37). Women, on the other hand, were not only excluded from this field, but even their conversations with their fellows in private indoor areas were found to be dangerous. Since the mid-1500s, it was said that men should keep their wives at home, and torture devices were even invented for women who came together for conversation during this period (Öğüt, 2020, p.84).

Based on all this historical background, it would not be wrong to say that female humor has been a personal struggle for survival. Within this context, female humor is also considered as a psychological strategy in managing anger, disappointment, and suppressed emotions (Walker, 1988). When we look at the situation of women in Turkey, we see that many steps offering opportunities for women, from the public domain to the workplace, have been taken with the proclamation of the Republic. However, as Serpil Sancar states (2014, p.112), during this period, women could not

become ruling citizens in equal position and status with the founding men, who were seen as the carriers of the national culture. The 1990s became the years when 'the forgotten' were rediscovered, both at home and throughout the world. The multiculturalism discussions that emerged in America in the latter part of the 1980s led to the formation and institutionalization of many fields, such as women's and gender studies, as well as LGBT studies (Soysal, 2017, p.215). These developments in studies concerning women took effect in Turkey from the 1990s and struggles regarding women's equal rights with men have gained momentum, with women's issues becoming more prominent in the public sphere. The inequalities that women have experienced for many years, made women loudly express this issue by the 1990s. This struggle naturally manifested itself in the field of humor, which had been dominated by men for years. The comedy series 'Sıdıka', which started broadcasting in 1997 and which was directed by Mahinur Ergun and performed by leading actresses Hasibe Eren and Füsün Demirel, is quite different from previous women-oriented productions in terms of drawing attention to women's unequal living conditions in a humorous way. After the 1990s, the number of women cartoonists increased with the women's movements, and women's problems were highlighted in humorous fashion. Feyhan Güver, who began drawing in the magazine Limon in 1993, made a name for herself playing the character of Bayır Gülü (Wild Rose), which focused on the problems facing women living in rural areas (Seven, 2016, p.24). In 2011, *Bayan Yanı* cartoon magazine, prepared with contributions of many female writers and illustrators, including those of the LeMan Magazine community, was published as a special March issue. However, as a result of positive reaction, it became a regular monthly publication (Boz, 2014, p.119). Female cartoonists, such as Ramize Erer, Feyhan Güver, İpek Özgül, Gülay Batur, Andaç Gürsoy, Aslı Perker, Nurgül Kaan, Melda Okur, Duygu Sarı, Raziyeİçoğlu, and Meral Onat contributed to *Bayan Yanı*, from its beginning in 2011. Even today, the magazine continues to be published by female illustrators. Since the 1990s, male stand-up comedians have played a dominant role. However, it is striking that in recent years, stand-up shows led by female comedians have gradually increased. For example, in December 2015, 'Çok da Fifi Hatunlar (I Don't Give a Fuck Babes)', a collective group formed by six female comedienne, carries the distinction of being the first all-women stand-up comic group not only in Turkey, but worldwide.

### Sitcom

Since the second half of 1980, with Turkey's articulation of a liberal economy, private television broadcasting began as a result of developments in the advertising and media industries. During this period, different program formats, including sitcoms, were imported into Turkey for private viewing. It can be suggested that the 'sitcom' in Turkey, with its imported format, can be considered to have been developed as a 'hybrid' (Özsoy, 2006, p.154) during the inclusion of these import formats into Turkey in the mid-1990s. In this sense, it is unique and differs from Western sitcom examples. One of the main differences here is the duration, and others are the cultural elements and jokes. The first examples of adaptations in the 1990s are the series 'Dadı'<sup>1</sup>, 'Sweet Life'<sup>2</sup>, and 'Belalı Baldız'<sup>3</sup>, which preserve the American format (Akyürek, 2009, p.25). The first original script-based sitcom example is 'Gülşen Abi' (Akyürek, 2009, p.27).

A sitcom is a combination of the words 'situation' and 'comedy'. The roots of the sitcom go back to the concept of 'farce' or rough comedy, popular in the eighteenth-century (Çelenk, 2013, p.87). However, the sitcom, which started its journey as a radio program format, has become one of the most popular comedy forms on television. The popularity of this type as a television format is due to the series 'I Love Lucy', which was first broadcast in the United States in 1951 and which focuses on the struggles of soldiers returning from the Second World War (Davies & Smith, 1998).

The sitcom, which emerged through an adaptation of the repeatable structures of these forms, and which was influenced by the vaudeville, musical, and sketches that preceded it, was formed by the transformation of the old forms (Nieale & Krutnik, 1994, p.227).

Sitcoms began to be filmed in front of live studio audiences and almost became identified with the applause effects used to maintain the same result in the following years (Mintz, 1983). Sitcoms, which are studio productions that take place in a single or a small number of venues, take their subjects from everyday life. The continuity of people and venue is essential in sitcoms consisting of twenty-four to thirty-minute episodes (Çelenk, 2013, p.86). Sitcoms focus on simple, everyday relationships in the daily life of the middle class in particular. With its structure that blesses the daily tenor, the sitcom turns the events that ordinary people encounter every day into a 'subject' (Çelenk, 2013, p.90). This magnifies and exaggerates the events and, as a result, all that people do in daily life becomes more visible. One of the most important elements in the sitcom is its dialogue. Dialogue creates comedy through the actions of the sitcom characters. The greatest source of the sitcom's attraction is its characters. This is because the audience establishes a relationship with the sitcom through the characters they mostly watch and adopt. For this reason, the characters in sitcoms are static in order allow the audience to establish a connection with them (Çelenk, 2013, p.94). Taflinger (1996) divides sitcoms into three categories; 1) Action-Based Situation Comedies (ActCom), 2) Character-Based

<sup>1</sup> Adaptation of Nanny

<sup>2</sup> Adaptation of The Jeffersons

<sup>3</sup> Adaptation of Hope and Faith

Situation Comedies (DomCom), and 3) Thought-Based Situation Comedies (Dramedy). According to Mintz, its subtypes are diversified. ‘Jet Society’ stands closer to character-based situation comedy (DomCom) amongst these categories.

A number of negative opinions have arisen due to the appeal of the sitcom format to the audience through its stability and repeatability. For example, Grote defines the sitcom format as static, because the nature of the events that continue with a new event every week does not change. Therefore, according to Grote, the sitcom is a type that resists all changes (Feuer, 2018, p.266-268). Contrary to these opinions of Grote, David Marc tries to reveal the destructive potential of sitcoms (Feuer, 2018, p.272). Marc sees a structure like a sitcom without any static nature as an opportunity to present the author’s expression, both ideologically and personally.

Meanwhile, Douglas Kellner (cited in Mutlu, 1991) mentions that comedy has two opposing features that are liberating and reconciling aspects. According to Kellner (cited in Mutlu, 1991), with its liberating aspect, comedy and specifically sitcom, has the potential to upset dominant cultural and social forms and to undermine their dignity. On the other hand, with its reconciling aspect, it teases the deviations from the ruling rules and values and teaches how to waiver from desires for the sake of order. Although Kellner (cited in Mutlu, 1991) suggests that the dominant form of sitcoms is usually reconciling, the sitcoms created by women producers and the Turkish sitcom example written by Gülse Birsell, have the potential to shake the supremacy of dominant power.

### **Gülse Birsell as a Sitcom Author**

Birsell, who stepped into the media sector as a columnist, undertook the copywriting and presentation of the program ‘g.a.g’, which included funny advertising content. She was a scriptwriter and actor for the sitcoms ‘Avrupa Yakası’ (European Side) (2004-2009), ‘Yalan Dünya’ (Fake Life) (2012-201), and ‘Jet Sosyete’ (Jet Society) (2018-2020). She also wrote the books ‘Gayet Ciddiyim’ (I am very serious), ‘Hala Ciddiyim’ (I am still serious), ‘Yolculuk Nereye Hemşerim’ (Where are you going my fellow citizen?), ‘Velev ki Ciddiyim’ (Albeit I am Serious), ‘Yazlık’ (Summer Resort) and ‘Memleketi Ben Kurtaracağım’ (I’ll Save the Country).

When she wrote the screenplay of ‘In the Family’ in 2017, this comedy exceeded 1.5 million viewers within the first ten days after it came out to and is ranked seventh amongst the most-watched movies of all time in Turkey<sup>4</sup>. When we look at Gülse Birsell’s sitcoms, we see that they are produced in a general structure and formulas specific to the format. She is also an important name in terms of showing that it is possible to discuss cultural and social issues through sitcoms, which are products of popular culture that confirm the thoughts of David Marc (Feuer, 2018). Beyond political humor, Birsell has opened the door to the possibilities of humor showing the norms of current culture to the audience, and that makes them question these again.

### **‘Jet Society’ Analysis and Results**

It is claimed that Gülse Birsell focuses on common social issues in this series and that she especially handles current issues with critical humor. Based on the view that confrontation between social classes, movement up the social ladder and class change are social issues, Birsell revolves around these. The study analyzes four episodes, including the plot, characters, and dialogues in micro and macro structures that highlight social issues, current events, and male-female relations.

‘Jet Society’ is a Turkish sitcom written by Gülse Birsell. The director of the series, which is produced by BKM, is Hakan Algül. The first season was broadcast on Star TV in 2018, the second on TV8, and the third season continued on Puhu TV and Star TV. The final and fifty-ninth episode of the series was broadcast on May 6, 2020.

**Plot:** Cengiz Özpamuk, the owner of a textile company, dismisses his son Ozan from the general director position of the company, therefore Yaşar Yüksel, who works at a lower level in the company, gains an unexpected opportunity. Yaşar, who is promoted to the position of general manager in the company, moves with his family from a slum where they live in Ayazağa to their villas in Jetset Konakları, in the housing estate of his boss. The series of events that begin with their settlement in his boss’ villa turn into a class change adventure for the Yüksel family as a spatial phenomenon as well as a social phenomenon. While Yaşar tries to prove himself in the field of textile and design, about which he has no idea, his wife and daughter try to be included in the routines of the high society they find themselves in. Members of the Yüksel family live together, with mother Safiye, father Yaşar, their daughter Yıldız, Safiye’s brother Gündüz and her sister Melike. Family members living in the villa change in certain episodes. The Özpamuk family, representing a rich family, consists of stepmother Gizem Özpamuk, father Cengiz Özpamuk, Cengiz’s mother Zahide, and also Ozan Özpamuk, son of Cengiz from his former marriage. One of Cengiz’s business partners, İlayda Çıkrıkçıoğlu, together with her sister Alara, live in another villa on the same housing estate. Other characters in the textile company are public

<sup>4</sup> boxofficeturkiye.com

relations specialist Pelin, designer Tonguç (Tony), and tea-maker Talip, who initially works closely with Yaşar. Talip, son of Şennur, who is a neighbour of Safiye from the same neighborhood, aspires to marry Yaşar's daughter Yıldız in the subsequent episodes.

**Venues:** The main venues in the series are the homes of the Özpamukçu, Çıkıkcıoğlu, and Yaşar families in the Jetset housing estate villas, the house of the former neighbor Şennur from the shantytown, and the offices of the Özpamuk textile company. Sometimes the setting in the series is the garden of the Jetset villas housing estate and a shopping mall and café/bar in the district, which serve as a meeting place for the gym or as a meeting place for characters who do not have direct connection to the storyline. In addition, the series framework expands with other venues, such as the neighborhood restaurant opened by the entrepreneur Talip who is Şennur's son, and the taxi stand in the shantytown. Due to an interruption of the TV series, because of the COVID-19 pandemic, the actors created their own spaces and places to take selfies, allowing the series to meet the audience without a break, as well as it being an attempt at a creative approach to the sitcom narrative and venues.

**Characters and Dialogues:** One of the most striking examples in the series is the character Gizem. Gizem played by Gülse Birsal, is noteworthy for her modern and urban appearance, as well as her speaking style that betrays her social class. As Meredith expresses, humor plays a vital role in exalting women from the 'cute stupid' they were cast as and glorifies them into admirable intelligence. (cited in Eagleton, 2019, p.95). Although Gülse Birsal creates an appearance within the stereotype of 'cute-stupid' mentioned by Meredith with her representation of women as a writer and actress, she also presents this woman as basically intelligent, unable to lie, and blunt. Gizem Özpamuk, played by Gülse Birsal, is an old model; her age, fashionable dresses, her style, and her position within the community and so on contain all the features of the superficial woman stereotype that gives importance to appearance. However, what is interesting is that behind the superficial appearance of Gizem, she has a view and perspective on social and current fundamental issues. This dual situation creates humor from the conflict between 'cute-stupid' and 'smart'. This is because the character of Gizem is also presented as a person with high self-awareness. It is as if the stereotype created by Gülse Birsal speaks with the writer Gülse Birsal. This dual situation of the Gizem character is revealed by the dialogues on stage in episode six of the series in the first season. This scene that we are going to exemplify also has aspects that discuss class discrimination and gender inequality, which are the two basic issues with which Birsal deals. The character Gizem Özpamuk has done excessive shopping with the credit card given to her by her husband Cengiz. In this scene her husband takes Gizem's credit card back.

**Cengiz:** From now on I'll keep this credit card. I won't give you cash either, I've taken the car with the driver I've allocated for you.

**Gizem:** How come?

**Cengiz:** From now on, I will give you a monthly minimum wage.

**Gizem:** What, a military wage? For example, a military wage like a general salary or a regular soldier's salary?

**Cengiz:** 1600 liras.

**Gizem:** What am I going to do with that much money?

**Cengiz:** Everything. Clothing, cosmetics, kitchen expenses, transportation, and from now on, you will spend this amount on all of your expenses.

**Gizem:** How will that be?

**Cengiz:** As the wives of others do.

The fact that Gizem is not aware of what the minimum wage is and her confusion of the words 'minimum' with 'military' not only shows that her education level is low but also shows that Gizem is a 'new urban dweller' who is far from the section of society that has to live on the minimum wage. The issue that the economic level of society and the cultural level do not match, is once again emphasized in this scene. On the other hand, among the dialogues of Gizem complaint with the 'cute-stupid' character, there is a tone showing that she needs Cengiz's economic power, but she also rebels against it. In this respect, Gizem's understanding of the word 'minimum' as 'military' is also a latent expression of her rebellion.

In the same episode, Gizem's discovery of the city lines ferry and comparing it to a yacht also gives clues about Gizem's intelligence under her 'cute-stupid' appearance. By humorously expressing that the amount of money she has is sufficient for everything, instead of complaining about the limited money that her husband had given her, somehow reveals the living conditions of the low-income portion of society and criticizes those who do not understand these conditions like her husband.

**Gizem:** Cengiz look, did you know that? There is one card, you get that card, you get on whatever you want, you travel all over Istanbul. Its a legend! Did you know that?

**Cengiz:** Yes.

**Gizem:** Maybe. For example, you also get on a boat. You get on the boat, Cengiz. You travel by boat all over Istanbul for 3 liras to 5 liras, and this boat is ten times bigger than our boat.

**Cengiz:** It is a ferry, my dear, a ferry.

**Gizem:** It doesn't matter, as a result, you get on a very big boat, you travel and so on, for free. Very cheap. Not money. Very cheap. We have spent so much money for years in vain, really it's idiotic.

The situation that Gizem points out with the word 'idiotic' also expresses rebellion over Cengiz's economic control. In the fourteenth episode of the TV series, where media criticism is frequently made, Gizem participates in the 'I Eat My Bride' program. Here, she also gets points from competitors according to her costume. Before the competition, she agrees with her husband Cengiz to wear clothes made by the clothing company owned by her husband and, thereby, to advertise them. However, Gizem does not manage to do this, and she messes up. When the sweater she is wearing becomes sought after, she gives the name of a rival company and she says she bought it from there. In episode twenty-two, we see Gizem, who acts as an actress, in the shooting of the series. In this scene, Gizem must be knocked down by a slap given by the man in front of her. However, Gizem does not fall to the ground despite the director's warnings and gives an important message to women about violence saying, "*We will get all of you women accustomed to standing upright, one by one*". These scenes reveal the character Gizem's pure and intelligent contrasts, and use humor through these contrasts.

These contrasts can be revealed with the side-by-side representation of rich and poor, modern and traditional situations, as well as through the contrasts of the same character. Alenka Zupancic, in her book 'The Odd One In: On Comedy', states that the twin theme is one of the great themes of comedy (2007, p.88). Gülse Birsell almost combines the theme of 'twinness' in one character in a postmodern way by establishing the conflicting twins with the inner conflicts and contrasts of a single character. The mother figure character of the Yüksel family, Safiye Yüksel, embodies the characteristics of the class she represents with her accent, her clothing and her daily activities, and the neighborhood relations in the shantytown she previously lived in. However, on the other hand, she attracts attention since she is equipped with a postmodern hybrid, following social and technological innovations and adapting them to her own life. In the words of Orhan Tekelioğlu (2017, p.19), Safiye is a 'hybrid' character. Safiye, who constantly hounds her husband Yaşar Yüksel in his slum in Ayazağa to earn more money, tries to keep up with this high society life when they move to the Jetset villas. The friendship that starts with Gizem, the boss's wife, is a way for the character of Safiye to take a closer look at high society life. Safiye's admiration of and taking example from the character of Gizem, as well as her exaggerated praises in the face of her behavior, reveal the struggle of someone trying to be included in this high life. The friendship between the characters of Safiye and Gizem raises a class issue in this respect. On the other hand, the affectionate movements we see on both sides of the friendship between Gizem and Safiye show us how close these two characters are with their contradictions. While Gizem constantly talks about her modeling and searches for a way to get on the stage, Safiye struggles to take Gizem as an example and enter her circle. In episode six, Gizem takes Safiye to her hairdresser and gets her to have a new hairstyle. Upon this the character Safiye says, "God bless ... if I go to Hollywood with this hair right now, I will never look like a stranger". These words from Safiye explain that she is a hybrid character on the way from a shanty town to Hollywood. It can be said that Birsell, through the character of Safiye, mirrors the class defined as both 'rich' and 'poor', which emulates the higher class. This dialogue between the characters of Gizem and Safiye is also from one of the scenes exemplifying the blurring of class boundaries.

**Gizem:** Safiye I'll ask something, you are poor, aren't you?

**Safiye:** Sort of.

**Gizem:** Good. I mean actual factually poor?

**Safiye:** Thanks be to God.

**Gizem:** Safiye, teach me poverty. But I want to be very good at this. I have a lot of ambition ... Teach me, Safiye, how to run a household and take care of all my needs with a military wage.

**Safiye:** Here is the distinguished professor in this field...

Alara, who dresses in black, speaks little, is asocial and psychologically problematic, but who is smart enough to advise her older sister Ilayda, is a character who is bored with the bourgeois lifestyle. For this reason, while looking for new excitement in life she is infatuated with Safiye's irresponsible and macho brother Gündüz whom she meets by chance. Although the words of blood and violence in the character Gündüz's troubled attitudes are diametrically opposite to his snoop Gothic attitude, Alara's love for Gündüz transforms both Gündüz and Alara over time. The character Alara enters a more authentic world, unlike the materialist environment she denies, thanks to Gündüz. In the sixth episode of the series, the character Gündüz takes Alara to the Talip Ocakbaşı, which is in the neighborhood, to eat sheep's head and heart. This event, which is a part of Gündüz's life rituals, is the practice of deepening the bourgeois life with a 'dangerous' experience for Alara. However, the really interesting thing is the rush of high society to this grill restaurant in the shanty town thanks to magazine press members watching Alara. The criticism of everyday life and social classes comes up once again.

The person whom the character Cengiz Özpamuk wants his son Ozan get married to is İlayda Çıkrıkçıoğlu. However, Ozan does not like İlayda, and the efforts of Cengiz to expand his wealth come to a full stop. The character İlayda, who is one of the prominent names of society life, with a father who owns a textile brand, actually studied pastry. İlayda, who does not work in the field in the specialty in which she received her education, manages her father's wealth. İlayda, who is regarded by the Özpamuk family as noble, rich and polite, grew up in a sterile environment and distant from people. With this attitude, she is shown to be repulsive and just like Gizem, who cares about her appearance and her position in society life more than anything else. The opposite characters of the sisters Alara and İlayda are also examples of Birsel's humor, based on the combination of different characters. In episode fourteen, Alara tries to use new concepts which she loves and has learned from the Yüksel family. She asks, "You're going to the toilet?" to her older sister when she gets up from the table, but her sister İlayda gets angry at this and responds, "*We don't talk like this, we say 'I'll powder my nose and come back.' Our environment requires this.*" This dialogue exemplifies the stereotype of a bourgeois woman falling in love with a macho man and her artificial glorification of a lifestyle that is not her own.

The character Melike, who lives with her sister Safiye and her brother-in-law Yaşar, differs from other exaggerated female characters with her natural attitude and beauty. Melike, who is portrayed as having graduated from an Agriculture Faculty in Eskişehir, is a very natural character who does not like to be idle and who is keen on working and producing. Additionally, a love that begins with Ozan, who lives off his father's money and does not like to work in the Jetset villas, gives rise to humor that emerges from the union of opposite characters, just like Alara and Gündüz. Teaching football to Ozan, who does not know how to play football in episode fourteen, is remarkable in terms of breaking stereotypes regarding gender roles.

One of the most colorful female characters of 'Jet Society' is Şennur. Şennur, who plays Talip's mother, participates in the series in the eighth episode where she is shown to be a pragmatic character who can be often found in daily life. Şennur is the type of woman who does not want to marry off her son, who is fond of her property, who is fond of gold and real estate, and who eats everything with the appearance of cutting down on food expenses. This female character is the antithesis of the 'elite' or 'snob' stereotype. Şennur's external appearance, speech, and attitudes combine her traditional female character with her entrepreneurship, which creates another 'hybrid' character. Şennur is another female version of Burhan Altıntop on the European Side when we consider her entrepreneurship, such as taxi stand business, high society fortune-telling, real estate, and so on. In the fourteenth episode, while Şennur tells us that she drives a taxi, she presents traditional speech and dress style, and she exhibits the contrasts of Western-Eastern, modern-traditional, and rich-poor with a multi-layered character structure.

The main issue that Gülse Birsel scrutinizes in her character is the local characteristic in the origin of her social elite class characters leaking from gaps in their 'elite' lives. Kumsal, who participates in the sixteenth episode of the series, balances the influence of İlayda Çıkrıkçıoğlu coming from a deep-rooted bourgeois family with the Black Sea nanny figure. Kumsal, portrayed as the former nanny of İlayda and Alara, is included in the life of the Çıkrıkçıoğlu family at their waterside residence. This character, who speaks with a Black Sea accent, wearing traditional scarfs on sportswear, represents the opposite of high society life. However, Kumsal also has authority over sisters. Kumsal, who falls in love with Talip, goes to the gym because she is jealous of Yıldız, and tries to attract Talip's attention with a pole dance, even though she is religious in nature. Şennur is also a fan of her because of the gold bracelets on her arm.

### Discussion

Gülse Birsel sitcoms generally include a sociological analysis that examines social change, starting in 1980 and then becoming visible in 2000 in Turkey, within the context of the characters. Gülse Birsel describes the contrasts between traditional and modern, new urban dwellers and the bourgeoisie in the aforementioned social change and the big difference in the context of lifestyles and new living spaces, described by Rıfat Bali, as 'the big difference as between night and day' (2002, p.18). As it's depicted in Rıfat Bali book "Tarz-ı Hayattan Life Style'e" (2002), on one side "there are business women, business men, communicators, advertisers, writers, magazine editors, and television producers"; "In the other corner of the picture, there are people with moustaches, sometimes with beards, with their white socks and their prayer beads in hand." The success of Gülse Birsel relies upon her narration portraying these two pictures or representations of Turkey that diametrically contrast with each other concerning their lifestyles, world-views, and approaches to social issues. She partially draws a panoramic view of Turkish people, while describing the establishment of a lifestyle in modern housing estates away from the city center with security services and lives far from the crowded city.

The series explains that class distinctions are not only spatial (domestic type, neighborhood), but also artificially produced through titles in business life. While it is criticized that the rise in business life does not necessarily follow the norms of merit, the adaptation problems in the new environment of the family produce comedy. It is understood that the Özpamuk family, which looks down on the Yaşar family, actually has no different views or expectations on

life, and that they care about their economic power and ‘being a name in community life’. In a sense, ‘Jet Society’ speaks to a world of its own that is known as the AB group (which is the children of middle-pole families working in plazas and business centers with the social and economic transformation after 1990). However, at the same time, it can be suggested that Gülse Birsel reflects the class defined as both ‘rich’ and ‘poor’ with male and female characters who emulate upward social mobility and handles it with a critical approach. However, it should be emphasized that such criticism, made using the language of humor, is neither didactic nor in a demeaning or judgmental manner. The series almost tries to reach everyone, not only to addressing a particular audience category, with its sincere narration reflecting the new upper-middle-class emerging after the 1990s during the adventure of modernization in Turkey, together with all the internal weaknesses. In this sense, the series brings together snobbish characters with elitist and superior attitudes, and the local, ‘regular’ and sincere characters, and produces humor through this unity. For example, the impossible love between the native, macho, but ‘regular’ young boy Gündüz, a member of the Yaşar family, and the western imitation of the Çıkrıkçıoğlu family, the socialite and gothic daughter Alara, reveals contradictions that are the source of humor.

The diversity of female characters in the ‘Jet Society’ series and their weight in the script are remarkable. The male characters, on the other hand, assume a partially complementary role and make the features of the female characters visible according to the general structure of the sitcom. The character Yaşar Yüksel, the father of the Yüksel family, emphasizes the personality of Safiye. Similarly, the textile manufacturer character Cengiz Özpamuk draws attention as a screenplay person who highlights the life and personality of Gizem Özpamuk, who creates a physical contrast with him. Even though the male and female characters are created as stereotypes, it shows that the patterns of gender are blurred, just as with the class differences. Within this context, a gender discourse is diminished by the other characters of the series, even by the character who produces the discourse.

A spatial gentrification phenomenon noticed in Gülse Birsel sitcoms, other than the characters, also continues in ‘Jet Society’. This is transformed into an important part of critical discourse by revealing the realization process of this within Turkey's socio-economic conditions and its urbanization strategy. With the new middle class after 1990, one of the most discussed issues has been the concept of gentrification, and the change of urban spaces in the lives of the new middle class. An important part of Gülse Birsel's critical humor, developed in the context of social classes, is naturally gentrified spaces or districts that change with their new guests. For example, Nişantaşı on the *European Side* is a place where the upper income group mainly lives as a part of the Western and modern lifestyle in the center of Istanbul. However, this place is transformed into a district where also the entrepreneurial character Burhan Altıntop, who hails from Anatolia, who is culturally trying to adapt to his new neighborhood, who is slippery, who thinks he is crushed and tries to crush others, lives and works. The sociological transformation in the *Yalan Dünya* (Fake World) is this time established through the Cihangir district, where the media, artists, and intellectual environment predominantly live. In ‘Jet Society’, the segments of society distant from each other, sharing the same district and urban space, are revealed by a humorous language, through the shanty house and neighborhood villas in housing estates with security services adjacent to each other in Ayağaza. In a sense, this explains the fact that class discrimination is not culturally-based, but economically-based, using the coexistence of two extreme worlds. While the culturally-based higher class is the old city dwellers or the townspeople, the economically-based upper class migrate to the city and are still making efforts to change their class, or they are the children of this generation that are now difficult to differentiate from each other. Therefore, the artificiality and irrelevance of the established hierarchies form the basis of the criticism. Gülse Birsel discusses the problems of the new urban population with humor and a degeneration that disregards urban law without being a party in practice between the traditional and the modern, or the old and the new urban dwellers.

### Conclusion

Historically, the patriarchal cultural order has directly or indirectly affected all practices related to social life. The field of humor, which has the power to create new meaning and which highlights intelligence, has also been shaped within this cultural structure and women have been kept away from the field of humor. Within this respect, as in examples throughout the world, in Turkey there are also few women who produce their own comedy materials and humor. Gülse Birsel is an extremely important name in a patriarchal social order in terms of reaching large audiences with the humor she produces in the field of a male-dominated popular culture. Birsel also creates an area of resistance by giving important social messages regarding gender inequality and class problems in an area where women remain in the background.

Although it seems mostly apolitical, the characters created by Gülse Birsel and the plots she builds make a political critique of everyday life using subtle humor and satire, while remaining free from current politics. With references to capitalism, neo-capitalism, the economy, the media, environmental problems, animal rights, class discrimination, violence against women, and anti-war themes, it makes you laugh/think about many issues and raises questions about these issues.

The sitcom format is especially based on events and relationships in the everyday lives of the middle class. Considering that most of human life consists of such moments, we see that sitcoms can also be an important critical tool that mirrors society. Birsal, who frequently includes stereotypes of men and women, rich and poor, also tries to show the contradictions more clearly by sharpening the traits of her characters. Birsal's approach to humor undoubtedly bears the awareness that we can understand each other better if we laugh at each other's weaknesses, mistakes, and flaws. As a female sitcom writer, Birsal reveals the liberating, but at the same time reconciling, aspects of humor.

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## Effects of Technology on Student Learning

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### ABSTRACT

The purpose of this study was to analyze the effects of technology on student learning. With the ever-changing world of technology, classrooms are gaining more technology and having to incorporate it into student learning. Although technology can benefit student learning, it can also be detrimental to the educational process. Technology enhances many learning opportunities and allows for student comfort but can also be a tool that is too heavily relied on and can potentially effect student fine motor development and problem-solving skills. In this research study, the researchers surveyed to K-12 educators to get feedback on how technology effects their classroom. This research helped determine how technology effects student learning. The findings showed that more training for teachers and students are necessary to better implement technology in the classroom. Furthermore, this research pointed out that students are more engaged and comfortable with technology, yet they can become a management concern.

**KEYWORDS:** Technology effects, Student learning, Motivation, Problem solving, Fine motor skills

### INTRODUCTION

Today's youth are growing up in a time where technology is constantly at their fingertips. The growing world of social media applications and internet sites spike interest in children. Additionally, cell phones, computers, tablets, free Wi-Fi, gaming systems, and electronic-based toys are all the rage in today's society. Students are growing up in a time when technology is a competitive fad. According to Klopfer, et al. (2009), "Every day, many students are spending countless hours immersed in popular technologies—such as Facebook, MySpace, World of Warcraft, or Sim City" (p. 1). In today's classroom, technology is becoming a more prominent form of learning. With the ever-changing world of technology, teachers work hard to incorporate technology into their everyday instruction in order to connect student passion with learning. According to Harris (2016):

Today's educators are under great pressure to provide 21st century students with a quality education based on 21st century standards. Those standards include providing students with the technological and informational skills needed to compete in an ever-changing, technology-driven world (p. 27).

Educators are constantly looking for the technological tools that are going to enhance the learning of their students. However, technology has been viewed as a great resource in classrooms that has heightened learning but has its negative effects on student learning.

With new information technology, education is fast becoming free of time and space. But every learner still needs to be connected to a scaffold of support for lifelong learning achievement. Students need parents, friends, and supervisors who are also teachers and coaches. The primary function of the school-to-work movement is to mobilize understanding and support so that students will acquire the skills, habits, values, and understandings essential to productivity in all the roles of life (Hakim et al. 2000, p. 263).

Technology is an important part of students' lives. Incorporating technology into the classroom has proved to be beneficial yet also has some drawbacks. Technology has helped student willingness and engagement and allows for the enhancements of learning. According to Fisher, et al. (2014), "The need for construction and engagement means that the best types of learning will be those that involve choices that the student can make, and learning where there are meaningful contexts where the student is engaged" (p. 5). But is this enough to outweigh some of the negatives? In a study conducted by Sülzenbrück, et al. (2011) that examined the effect computer use has on

motor skills, they discovered that using modern technology could effect changes in basic psychomotor and cognitive skills. This includes using tools such as computers, electronic organizers, navigation systems, etc. This can cause concerns in student growth in the classroom. Furthermore, research also shows some pros and cons and goes in depth into why technology may or may not be beneficial.

The purpose of this study was to examine K-12 educators' perceptions regarding the use of technology devices in the classroom, the benefits and drawbacks of the use of technology in education, and particularly the impact on students' learning. For the purpose of this study, technology included only educational technology, i.e. internet and computer-mediated tools. It is important to understand the impact of technology on student learning because it can significantly impair or empower the learner. This study was intended to help educate teachers on best practices in the classroom. Students can benefit from instruction that is aimed to help them achieve success. Parents of students can discover how technology impacts their child's learning. The findings from this study will contribute to existing knowledge on technology incorporation in classroom settings.

### **LITERATURE REVIEW**

While technology has become increasingly more popular in classrooms, there is a concern that students are relying too heavily on technology. While technology can be a great tool, are students prepared to problem solve technology related issues?

With the use of technology, some teachers are adopting the flipped classroom approach. This allows students to study the material at home and come to school to engage in more discussions, exercises, and activities. According to Song and Kapur (2017), "few studies have reported how to develop students' problem solving skills and enhance their conceptual understanding in flipped classroom in mathematics inquiry" (p. 293). While in this setting, students are learning more on their own, they are missing out on some of that lecture time that can spark deep conversation on problems. This article looks at the different benefits and concerns of a flipped classroom.

Fisher, et al. (2014) discuss how classrooms are turning to technology for teaching and learning, and how teacher's roles have changed. The teacher becomes the facilitator, who takes the students on their learning journey, learning with them instead of 'teaching' them. Students needs to make judgements about and be able to calculate the value of the content they gather. Learners are also self-assessing using technology. This helps to "move learners from being the consumers of information to being producers of it" (p. 11).

### **FINE MOTOR SKILLS**

With more integration of technology, the effect it has on fine motor skills is questionable. Some research has dug into this topic, but it is still fairly undiscovered. Purcell, et al. (2013) provide a comprehensive report about social media's impact on writing. Students and teachers talk about what they consider writing to be. Teachers also discuss how social media has been helpful and harmful to classroom writing. Teachers "encourage their students to do at least some writing by hand...because they feel students do more active thinking, synthesizing, and editing when writing by hand, and writing by hand discourages any temptation to copy and paste others' work" (p. 6). Due to social media, students are able to write collaboratively, share their work with more people, and be more creative in their writing.

Sulzenbruck, et al. (2011) indicate "there are indeed specific differences in basic fine motor skills depending on the amount of time spent typing and handwriting texts" (p. 250). Their study does not only focus on handwriting but fine motor skills in general. Computer use also has in impact on major behavioral requirements.

### **MOTIVATION**

As teachers, it is our number one priority to motivate students in their learning. The more motivated students are to learn something new, the more likely the student is to retain the material. Research shows that while growing up in the ever-growing technology world, the incorporation of technology helps motivate students to learn. For example, Schaen, et al. (2016), discuss a project they conducted that allowed third grade leaders and first graders to work together and create an app that will allow kindergarteners to practice math strategies. This weeklong project allowed students to use technology, collaborate, and teach. Schaen, et al. study discussed the process that the students went through and the outcomes of the project. This technology enhanced project motivated students who wanted to continue building and working at home. "The project gave young students a real-world purpose for planning and creating collaboratively" (p. 509).

In another study, Millar (2013) focuses on motivating students in the classroom and how this can be a difficult task. Using technology is, "like giving each student their own smartboard" (para. 3). They can show what they

know, and teachers can be comfortable knowing learning is occurring. The use of technology allows all students the opportunity to participate, “It’s hard to be honest when you have to put your hand up in front of the room” (p. 2).

Similarly, Heafner (2004) discusses how technology allows students to search and find information easily and has “helped them understand what they were talking about in class” (para. 22). This supports the learning happening in class. They feel proud to share their work and knowledge mastered via technology. Students also feel confident in using technology and completing tasks. The confidence helps them establish motivation in their learning.

### **EXPANDING LEARNING**

According to many educational sources, there are many ways to expand and enhance student learning through the incorporation of technology. Bitner and Bitner (2002), have spent years working with teachers and technology and synthesized eight different areas that seem to help with teacher integration. Their article focuses on the following eight areas:

1. Fear of Change
2. Training in basics
3. Personal use
4. Teaching models
5. Learning based
6. Climate
7. Motivation
8. Support

The article then goes into more detail on each of the areas and discusses why these areas are important to integrating technology into the classroom. Once these areas are met, integration of technology can best help students in expanding their learning.

In another study, Klopfer, et al. (2009) discussed how students are growing up and are completely normalized by digital technologies (p. 1). The study explained that “many students in this group are using new media and technologies to create new things in new ways, learn new things in new ways, and communicate in new ways with new people-behaviors that have become hardwired in their ways of thinking and operating in the world” (p. 1-2). While there is much resistance to incorporating technology, “there are countless examples of these technologies demonstrating their educational value to other industries, confirming the powerful learning opportunities and advantages they afford” (p. 2). While determining the effects technology has in our classrooms, Klopfer, et al. strongly believe that the incorporation of technology makes the classroom stronger. They argue that “undoubtedly, without these recent technologies (i.e. digital games, Web 2.0, etc.) in the classroom, strong lessons can still be achieved, but there’s a sharp disconnect between the way students are taught in school and the way the outside world approaches socialization, meaning-making, and accomplishment” (p. 3).

Shivakumar and Manichander (2013) discuss education within the 21<sup>st</sup> century and how that technology is a powerful tool for students. They emphasized collaborating with one another and incorporation of blended learning, as well as information and communication technologies (ICT). “ICT refers to technologies that provide access to information through telecommunications” (p. 21). In using ICT in education, teachers are able to familiarize themselves with technology and some of the issues that arise (p. 21). This paper goes on to discuss different forms of ICT and how they benefit the classroom.

### **METHODOLOGY**

The researchers utilized a mixed method approach to understanding how the integration of technology affected students’ learning. A survey was developed and administered through Qualtrics to collect data. The survey contained 14 questions that utilized a variety of questions formats such as open-ended, multiple choice, and Likert scale. Plano, et al. (2010) describe the survey research design process as being fairly flexible. The researchers utilized this approach and synthesized trends revealed by the data. The survey was sent to K-12 educators at a local school district in central Illinois. Participation was voluntary. The data was analyzed using descriptive statistics such as means, standard deviation, and percentages. Qualitative data was analyzed and organized into emerging themes. The quantitative and qualitative data was triangulated to help answer the research questions.

The study was intended to answer the following research questions:

1. What are the teachers’ general views regarding the use of technology in teaching and learning?
2. What are teachers’ perspectives regarding the impact of technology use on student learning?

3. What are teachers’ thoughts regarding other positive and negative outcomes of incorporating technology in the classroom?

## RESULTS

The purpose of the study was to better understand how the effect of technology in the classroom is helping or harming our students. In general, data shows that the participants seem to view technology as a tool that enhances learning and engages students. They pointed out that technology is used for a variety of purposes. Figure 1 shows the breakdown of how teachers utilize technology in their classroom.

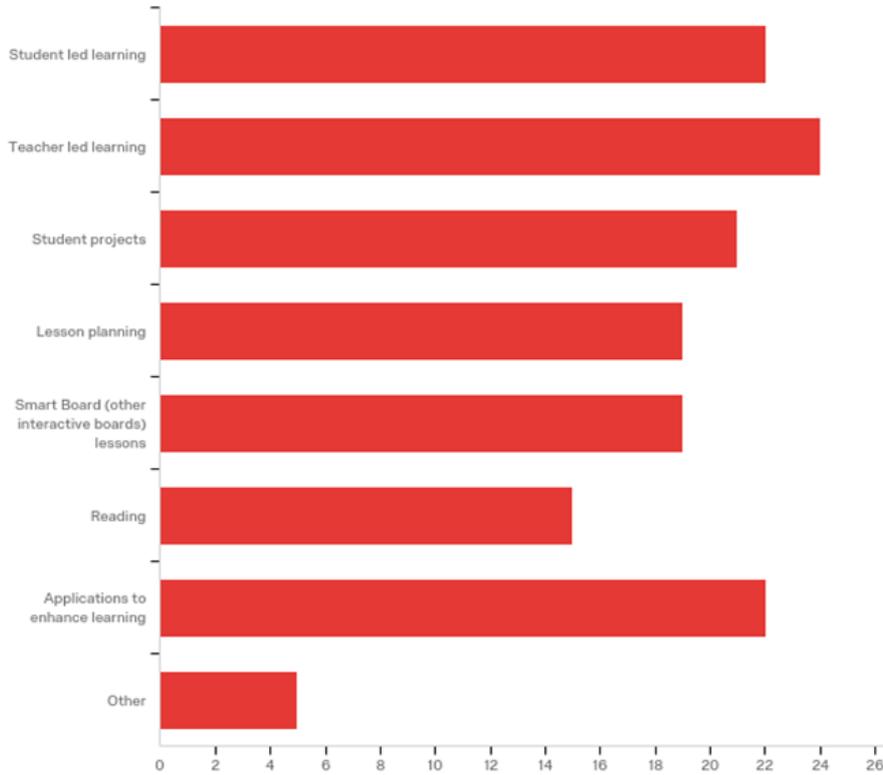


Figure 1- How teachers utilize technology in the classroom

Teachers using technology state that the majority of their time spent on technology is geared at teacher led learning. This includes using the smart board for teaching lessons and other applications to help enhance student learning. A small portion of teacher technology time was spent on lesson planning and communication. Teacher participants reported that students also took more interest in learning when it involves technology. The teachers stated that technology is used by students for projects and creations, collaboration with peers or adults, reading, and other applications to enhance learning such as math centers.

In determining the teachers’ general views regarding the use of technology in teaching and learning, the researcher wanted a better idea of the time spent using technology district wide. Figure 2 shows the amount of time students engaged in technology daily. Teachers report that students in the districts spend mainly thirty minutes or less a day engaged in technology. The choices count and percentages for the minutes per day that students were engaged in technology were as follows: 0-30 minutes a day was 12 (41.38%); 30-60 minutes a day was 7 (24.14%); 60-90 minutes a day was 7 (24.14%); 90-120 minutes was 2 (6.90%); more than 120 minutes a day was 1 (3.45%). The total count was 29.

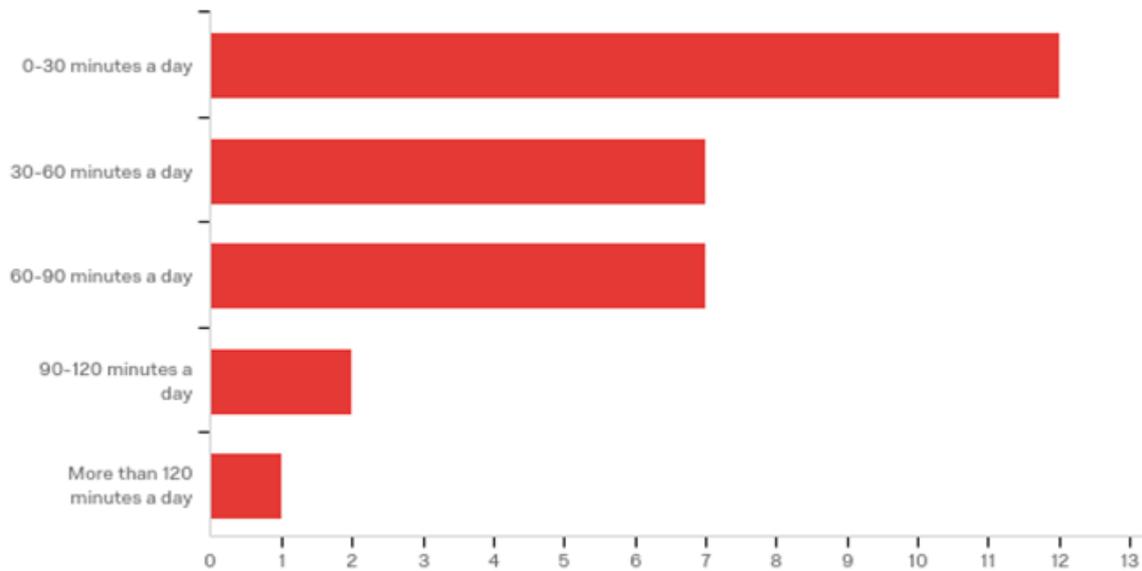


Figure 2. Minutes per day that students engage in technology.

When asked if the classroom has a designated handwriting block, 72.41% of the teachers responded with no. Of the teachers that have a handwriting block, they spend around 15 minutes on average daily. Teachers stated that they need more access to devices (1:1 (one to one technology), chromebooks, iPads, computers) in order to be successful in implementing technology in their classrooms. They also feel time is a necessary resource as well. Time is needed to do research on available platforms, websites, applications, and learning tools that would be beneficial for students. Time and money are required for training teachers on how to use and implement the available technology. Time is also a factor for educators to teach their students how to use technology accurately and efficiently. Lastly, the teachers said they need “problem solving methods for technology problems.” When asked, “If technology fails or is unavailable, are your students familiar with other research/learning methods...?” almost sixty-nine percent of teachers said that their students were capable of using alternate methods to find answers to their questions or gather research.

The availability of technology varies across the district. Some classrooms are at, or close to 1:1, while others have many students and few devices. It was also mentioned that some classes share technology or technology space. The district has implemented a Bring Your Own Device (BYOD) program in grades five through twelve. Within the school district, there is a wide range of technology being utilized on a daily basis. In reviewing survey data, there were many teachers that shared their positive outcomes when it comes to technology, as well as the negatives.

The usage of technology in the classroom comes with its many perks according to teachers in the district. With the inclusion of technology in the district, we are opening our students up to so much more information than we could do with the resources within our classrooms. Technology is how kids learn in the world today and it is what they feel most comfortable using. Technology provides a high student interest, allowing them to engage in their learning at multiple levels. With the growing amount of technology, teachers feel that students have a good deal of choices when studying and allows them to be self-sufficient learners in and out of the classroom.

With enough current and reliable technology, it can greatly affect the way in which students interact and learn within the classroom setting. The survey asked teachers to share their top three technology sources that they utilize in the classroom. Survey results showed a large range in the top three technology resources that are used district wide to enhance student learning, as well as teacher growth and planning. These resources and interactive games allow for high interest learning, while allowing teachers to differentiate material when needed. With the students’ excitement and willingness to engage with technology, they are able to access these resources to help them be more successful, enthusiastic learners. Within school settings, there are a variety of different learners. Some students need the extra challenge, some need the extra academic support, and others may need technology to help them with everyday skills. The use of technology allows students with disabilities the opportunity to utilize speech to text software. This allows students who are more successful at verbalizing their thoughts the opportunity to work on developing their writing and speech skills. The inclusion of technology at station time allows students the opportunity for intervention or enrichment.

As there are many positive outcomes to technology in the classroom, there are some negative outcomes as well. While technology gives students more information at a quick pace, there’s also so much information that is incorrect or not appropriate for school. This could make it difficult for teachers to monitor. One of the top complaints of technology in the classroom is that it just doesn’t seem to work at the time you need it to work and we are “at the mercy of the server.” The technology in the classroom is not always responsive and the Wi-Fi doesn’t always work. In reviewing the survey results, the teachers are most frustrated in technology when it does not function correctly. One response shared how having technology issues during the day results in a delay in teaching time.

Some teachers feel that the use of technology becomes more of a management concern. “The time it takes to get students logged in and logged out during a station that is 15 minutes long” ends up taking up half of the station. With the amount of time it takes, it can cause distractions. “Students will find ways to be distracted by the device they are using, such as doing random google searches during work time.” One response shared that, “technology has a tendency to increase distraction and dishonesty in some students.”

One of the final negative effects of technology is the availability of technology and the need for more staff and student training on these devices. Teachers want to make sure students know where to go and what to do so that instructional time is not being interrupted. With students that need more guidance with technology, there is not much teacher time throughout the day to support them. One participant shared that their confidence in technology is not high and knows that there is more that they could be doing in the classroom with technology to enhance student learning.

While it is not stated whether or not teachers believe it is a positive or negative impact, 79.31% of teachers believe that students probably or definitely rely heavily on technology. Figure 3 shows how heavily teachers feel students rely on technology. Many students are relying on technology, but teachers believe that with this heavy reliance, 68.97% of students are familiar with other forms of research/learning models, such as dictionaries, nonfiction texts, alternative games, or exercises.

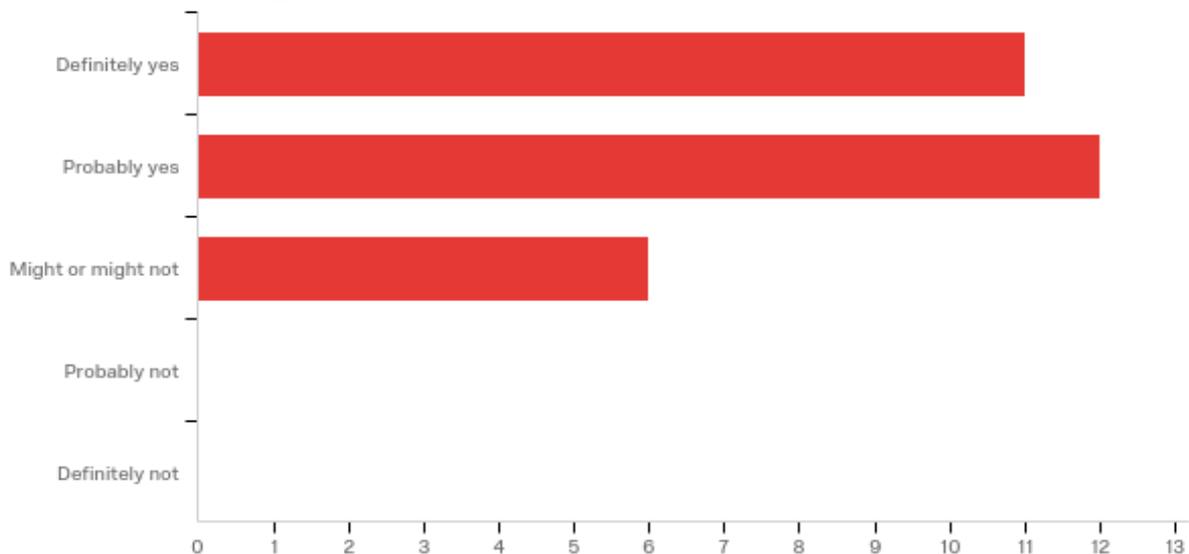


Figure 3- Student reliance on technology

## DISCUSSION

The purpose to the research study was to determine the effects that technology has in the classroom. The questions asked through the given survey were meant to provide information to answer the following questions:

1. What are the teachers’ general views regarding the use of technology in teaching and learning?
2. What are teachers’ perspectives regarding the impact of technology use on student learning?
3. What are teachers’ thought regarding other positive and negative outcomes of incorporating technology in the classroom?

The data shows that 62.07% of the participants were Elementary teachers. Figure 4 shows the different ways teachers utilize technology.

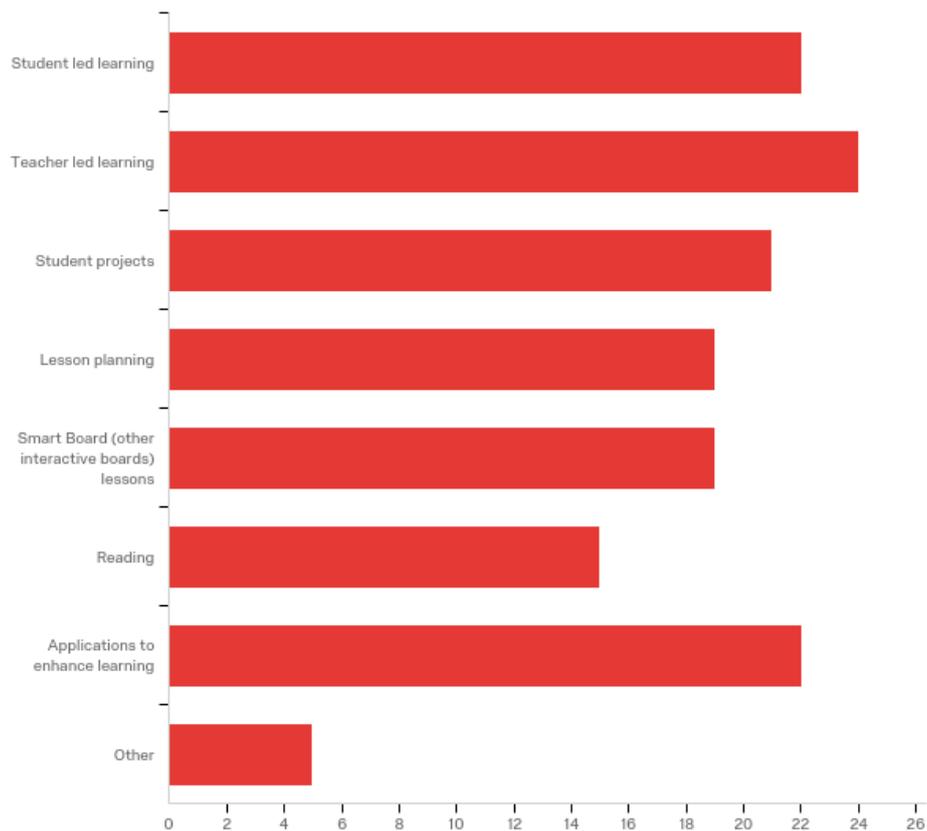


Figure 4- How teachers utilize technology in the classroom

The participants also reported using technology for communication and collaboration among peers, students, and parents. They also administer testing, create art, and use it for math centers. Bitner and Bitner (2002), explained that once the eight keys to success are followed, technology is the best way to help students’ growth. Three of the eight keys to success are personal use, teaching models, and learning based. Looking at the results in figure 4, teachers are sharing their personal use in technology, such as lesson planning. Teachers are providing different teaching models and ways of learning by using teacher led learning, student led learning, student projects, etc.

Figure 4 shows that teachers are utilizing technology in the classroom for student led learning and student projects. This is further supported by Klopfer et al. (2009). They stated, “many students in this group are using new media and technologies to create new things in new ways, learn new things in new ways, and communicate in new ways with new people-behaviors that have become hardwired in their ways of thinking and operating in the world” (p. 1-2). This supports the importance of and need for more student access to technology.

When participants were asked if they feel that their students rely heavily on technology, figure 3 shows that there is more of a reliance on technology than not. A study by Purcell et al (2013) shared that teachers, “encourage their students to do at least some writing by hand...because they feel students do more active thinking, synthesizing, and editing when writing by hand, and writing by hand discourages any temptation to copy and paste others’ work” (p. 6). This article discusses the importance of handwriting. With newer technology, students spend more time typing than before, that can affect student’s fine motor skills. Sulzenbruck et al. (2011) indicate “there are indeed specific differences in basic fine motor skills depending on the amount of time spent typing and handwriting texts” (p. 250). Survey results showed that 72.41% of educators do not have a designated handwriting block, which can affect student fine motor skills.

The participants were asked to share their feelings regarding the positive and negative impacts that technology has on students or their learning. Many participants shared that students are more engaged and motivated in their work when technology is involved. This supports one of Bitner and Bitner’s (2002) eight keys to success. The motivation for teachers and students to want to use the technology helps enhance their learning. The participants also shared that the students are comfortable with the use of technology in their learning. Today’s students have grown up in a digital community. Student have had a large range of technology experiences. Using technology allows them more comfort in their learning. Erin Millar (2013) explained that , “It’s hard to be honest when you have to put your hand up in front of the room” (p. 2). This allows for all students to feel safe while participating.

When asked what some of the biggest problems were with technology implementation, some teachers shared that they feel more technology training would be beneficial for their students and themselves. Some teachers also shared that they do not have much confidence when it comes to technology. In referring back to the eight keys to success, Bitner and Bitner (2012) stated that how fear of change and training are important for student success in technology.

## CONCLUSION

The findings of this study show that there are many positive and negative aspects of technology use in the classroom. Although looking through survey results, teachers did share more positive impacts of technology than negative. There were areas that teachers felt like they could use more support, but that they felt that student motivation and engagement were higher with the use of technology in the classroom. Moving forward, teachers would benefit from more personal training on implementing the technology in the classroom so that they feel more comfortable with the inclusion of technology. Educators also felt that students need more training with the provided technology to help promote more independence. The researchers believe that there needs to be more research completed to determine the effects technology has in the classroom.

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