

Analysis of the Relationship between Online Learning Activities and Academic Achievement of Physical Education and Sports School Students

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ABSTRACT

This research, which was performed in order to determine the relationship between some activities in the online learning environment and their academic achievements of Physical Education and Sports School students, was designed in a relational scanning model. The research was conducted on the data of 444 students who attended online classes at a physical education and sports school of a state university in the spring term of the 2020-2021 academic year. Data used in the research were collected through “Aid for Learning Management System (ALMS)” and “Student Information System (SIS)” of the relevant university. The duration of watching the courses live and from the archive, the number of downloading the course documents and the duration of watching the course videos uploaded were obtained within the scope of online learning activities via ALMS; and the academic achievement scores of the students for these courses were obtained via SIS. As a result of the research, a positive and significant relationship was found between course attendance, the duration of watching the archived and uploaded course videos, the number of downloading course documents and students’ gender and their academic achievement scores while there was no significant relationship between students’ grade level and academic achievement scores. According to the significant correlations, it was seen that the duration of live course attendance and watching from the archive significantly predicted the academic achievement scores of the students while the duration of watching the course videos, the number of downloading the course documents and gender did not significantly predict the academic achievement scores of the students.

Keywords: Academic Achievement, Activity, Physical Education and Sports, Online Learning, Student

INTRODUCTION

The Covid-19 pandemic, that occurred on a global scale, has deeply affected the education system due to its basic input and output being human and its close relationship with other social systems. In this process, the distance education method, which has systematically existed for a long time, gained importance and the sustainability of education and training activities was ensured with the compulsory distance education system in all education levels from basic education to higher education. Distance education is defined as an education system in which individuals who are physically far from each other come together through technology tools and applications, and interaction is established by providing time and space flexibility (Aydemir, 2018). Distance education is a planned educational process in which the learner and the teacher are physically far from each other and connect with each other through communication technologies with online learning content (Rovai and Downey, 2010; Simonson et al., 2011). Today, we come across different forms of distance education applications such as web-based education, e-learning, mobile learning and online learning with the development and spread of information and communication technologies, and these concepts are sometimes used interchangeably (İşman, 2011; Özgöl et al., 2017). In this regard, online learning being a new form of distance education is defined as learning environments where learners and teachers can communicate and interact simultaneously (synchronously) or asynchronously, and absorb the necessary knowledge and skills through the Internet (Chang, 2003; Moore et al, 2011; Morrison, 2003).

Online learning has become the most preferred method in education because of the flexible learning it provides for students and instructors at any time regardless of physical location (O’Lawrance, 2005). Courses in online learning can be performed synchronously and asynchronously. Synchronous courses are those that provide an online learning environment where students and teachers interact by sharing audio and video in different places at the same time while students can access the teaching content by taking part in the education process at different times and in different places, independently of the teacher in the asynchronous courses (Erfidan, 2019; Yıldırım, 2020). Courses can be conducted through “Learning Management Systems (LMS)” by using such software applications as Adobe Connect, Zoom, Moodle, Canvas, Microsoft Teams, Skype, Blackboard, Big Blue Button, Google Meet and Perculus within the scope of online learning. LMS appears as software applications developed for the execution, documentation, monitoring, reporting and automation of training programs and courses (İzmirli and İzmirli, 2020; Seven and Abban, 2021). Synchronous courses are also recorded on the system and can be viewed asynchronously from the archive later on. Regarding these courses through the “Learning Management System”,

course documents such as texts, video, presentation, audio, question bank, link activity, etc. can be uploaded and students can always access them, students can be assigned homework-project works and all kinds of exams (multiple choice, open ended, matching, sorting etc.) can be performed. Moreover, students can communicate and interact with each other and with the instructors with the tools such as e-mail, telegram, message box, forum, etc. depending on the applications hosted by the "Learning Management System".

With the global pandemic, distance education has been started in primary, secondary and higher education in our country as in all countries, and online learning platforms have been used in this process. In this context, with the decision taken by the Council of Higher Education (YÖK) in our country, compulsory distance education process has been started as of 23 March 2020 in universities and it has been decided that the spring semester will be continued with distance education, open education and digital education opportunities (YÖK, 2020; YÖK, 2020a). For the 2020-2021 academic year, YÖK took a new decision; *"it has paved the way for universities to plan their education calendars to start after 1 October 2020, and to make different applications on the basis of faculty and program by providing wide opportunities for universities to "dilute students on campuses and reduce mobility". At this point, the relevant committees of the universities were asked to decide on the applications to be made for different programs according to the regional and local course of the epidemic."* (YÖK, 2000b). After the start of pandemic process; *"72.6% of state universities and 60.6% of foundation universities switched to distance education, and as of 31 March-6 April 2021, 27.5% of state universities and 39.5% of foundation universities gradually started Ababan distance education completely. When the distance education practices of universities are examined, it is observed that more than 99% of both state and foundation universities carry the theoretical courses to distance education. The decision to teach the theoretical parts of the applied courses by distance education along with the theoretical courses has been approved by approximately 88% of the state and foundation universities"* (YÖK Uzaktan Öğretim Anketi, 2020).

In order to ensure learning in an online learning environment, there is a three-component interaction namely student, teacher and content (Garrison et al., 2020). According to the content of the courses conducted in online learning environments, many types of activities are interacted with. These are generally such activities as synchronous/asynchronous virtual classroom courses, course materials, assignments and projects, file sharing, in-system messaging, discussion forums, exams, etc. (Tuncer and Taşpınar, 2008). In this context, teaching is carried out through the interaction of students with each other and with the instructor of the course and teaching materials, synchronously or asynchronously (Aase, 2000). At this point, these interactions are very important in terms of reaching richer learning outcomes in order for online learning environments to be more effective and efficient (Garrison et al., 2020; Kılınç, 2022). The extent to which students find the learning activities offered to them meaningful in online learning environments, and the meaning and value they attribute to this process can also be determinative on the perceived advantages and disadvantages of the courses conducted with the transformed learning approach (Ay and Dağhan, 2022). The researches analyzing readiness, expectations and learning styles of students for online learning environments (Akyüz & Numanoğlu, 2020; Bakaç, 2022; Hacıcaferoğlu and Güner, 2021; Konak, 2021; Sakal, 2017; Sarıtaş and Barutçu, 2020; Şahin, 2022); attitudes, perception, motivation and stress (Abbasi et al., 2020; Aktaş et al., 2020; Ayhan, 2022; Bayındır, 2021; Coşkun and Çetin, 2022; Ergül, 2006; Etlioğlu and Tekin, 2020; İbicioğlu and Antalyalı, 2005; Oducado and Estoque, 2021; Özdirek and Cicerali, 2021; Yılmaz, 2020); self-regulation and self-efficacy (Baltacı et al., 2022; Çok, 2021; Özen & Karaca, 2021; Tuğtekin, 2022; Yıldız and Seferoğlu, 2020) and their experiences (Acar, 2022; Aral et al., 2022; Karaman et al., 2021; Tekedere et al., 2022) can be given as examples of these studies.

It is observed that the academic achievement of the students within the scope of online learning is mostly examined by associating them with the perspectives given above, and the relationship between direct online learning activities and the academic achievement of the students is examined in the research of Yavuzarslan and Erol (2022) on "using the learning management system log records in the estimation of academic success". In their work, Yavuzarslan and Erol (2022) applied some classification algorithms for the estimation of academic success on the log data obtained from the Moodle-based LMS, which 93 students enrolled in the 2020 Spring semester Basic Computer Applications course used for a period of 10 weeks. In the log files obtained, the number of logins, the number of viewing past topics, the total and average number of views, the total and average session duration, the number of downloading homework materials, the number of homework attempts, the time spent on homework, the exam focused study, the number of messages sent to the instructor, the time spent on video pages, and the number of homework uploaded were converted into attributes, and as a result, it was concluded that the LMS log records could be used in the estimation of academic success. In the sample of physical education and sports students, no research was found in this regard. As in face-to-face education, it can be determined by measurement and evaluation activities whether the expected goals in the courses are achieved or not in online learning environments (Phipps and Merisotis, 2000). This study aims to examine the relationship between the online

learning activities and academic achievements of Physical Education and Sports School students, and it is thought to contribute to the literature.

METHOD

This study, in which the relationship between some activities of the Physical Education and Sports School students in the online learning environment and their academic achievements was examined, was designed in the relational scanning model. Relational screening model is a research model that examines whether there is a relationship between two or more variables (Karasar, 2012). The research was conducted on the data of a total of 471 students who attended classes online in the 1st and 2nd year of a physical education and sports school of a state university in the spring term of the 2020-2021 academic year. Within the scope of the research, 444 students who participated in at least one of the activities of attending classes synchronously (live), asynchronously (from the archive) for 14 weeks, downloading course documents and watching videos uploaded about the course for 14 weeks through the "Learning Management System (LMS)" of the university were included. For the research, the necessary permission was obtained from the ethics committee of the relevant university with the decision dated 13.10.2021 and numbered 2021/9-7.

The raw data used in the research were obtained by two methods. In the first method, the duration of watching the courses live and from the archive (seconds), the number of downloading the course documents and the duration of watching the course videos uploaded (seconds) were downloaded from the system as an excel table within the scope of 14-week online learning activities of students via LMS. However, in the second method, the academic achievement scores obtained by calculating the students' midterm (30%) and final (70%) exam grades for these courses over the "Student Information System (SIS)" of the university were downloaded from the system and coded into an excel file together with their gender and class information. Then, the necessary controls were provided on the excel file and the data were transferred to the SPSS 22.0 program. In the research, students' academic achievement scores are the dependent variable and their gender, class, participation time in the online learning activities, live and archive attendance, number of downloading course documents and watching course videos are the independent variables. In the study, discontinuous (categorical) gender and class variables were coded as dummy variables and included in the analysis.

SPSS 22 program was used in the analysis of the data. In addition to descriptive statistical techniques, Pearson Product-Moment correlation and hierarchical regression analysis were used to determine the relationships between variables. Before proceeding to the regression analysis, it was first examined whether there were missing and extreme values and the necessary assumptions for the regression analysis were tested. At this stage, it was determined that there were no missing or extreme values, and that the skewness and kurtosis values of the data remained between (± 2) and showed a normal distribution. However, the continuous variables of watching live courses and watching videos show a high correlation with each other, so the raw times for the relevant variables were subtracted from the mean of the relevant variable and then included in the analysis. As a result of the analysis, it has been determined that there is no multicollinearity problem found due to the autocorrelation (DurbinWatson (DW)=1.929) problem among the observations in the data set and the correlations between the independent variables being below .80. In addition, it has been observed that the tolerance value, which is the multiple linearity control tests, is greater than 0.2 and the VIF value is less than 10. In this direction, it has been observed that there is no multicollinearity problem between the dependent variable and the independent variables and the necessary assumptions for the regression analysis are provided (Pallant, 2007). The findings obtained were interpreted at $p < .001$, $p < .01$ and $p < .05$ levels.

FINDINGS

Table 1. Distribution of Descriptive Characteristics of Students

Characteristic	Category	n	%
Gender	Male	250	56.3
	Female	194	43.7
Online Courses	Scientific Research Methods	98	22.1
	Children and Sports	97	21.8
	Physical Education and Sports Education Programs	59	13.3
	Education Psychology	40	9.0
	Education Philosophy	43	9.7
	Public Administration	54	12.2
	Turkish Education History	53	11.9
Grade	1 st Year	137	30.9
	2 nd Year	307	69.1

Total	444	100.0
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When Table 1 is examined, it has been observed that 250 (56.3%) of students are male and 194 (43.7%) are female. Of the students, 98 (22.1%) received Scientific Research Methods, 97 (21.8%) Children and Sports, 59 (13.3%) Physical Education and Sports Education Programs, 40 (9.0%) Educational Psychology, 43 (9.7%) Philosophy of Education, 54 (12.2%) Public Administration and 53 (11.9%) Turkish Education History course online. According to the grade level, 137 (30.9%) of the students are first-year students and 307 (69.1%) are second-year students.

Table 2. Descriptive Statistical Results of Academic Scores of Students (n=444)

	Aver.	SD	Min.	Max	Skewness	Kurtosis
Academic Achievement	63.95	16.12	0	99	-.936	1.890

When Table 2 is examined, it is seen that the achievement scores of the students who attend the online courses vary between 0 and 99 and the average academic achievement score is 63.95 ± 16.12 . It is observed that the skewness and kurtosis values of the students' academic achievement scores are between -2 and +2. According to this result, it can be said that the scores show a normal distribution (George and Mallery, 2010).

Table 3. The Relationship Between Online Class Attendance Activities and Academic Achievement Scores of Students

	AA	LCA	AAC	WCV	DCD	Gender	Grade
Academic Achievement (AA)	1						
Live Course Attendance (LCA)	.243**	1					
Archive Attendance of Course (AAC)	.105*	.006	1				
Watching Course Videos (WCV)	.142**	.725**	-.046	1			
Downloading Course Documents (DCD)	.105*	.315**	.119*	.312**	1		
Gender	.100*	.391**	.040	.213**	.259**	1	
Grade	.014	-.116*	.140**	-.141**	.061	-.011	1

* $p < .05$; ** $p < .01$

It is observed in Table 3 that there is a positively moderate relationship between academic achievement scores of students and the duration of the live attendance in the course ($r = .243$; $p < .01$), and a positive relationship with duration of watching course videos from the archive ($r = .105$; $p < .05$), and with the duration of watching course videos ($r = .142$; $p < .01$) while there is a positive but low level correlation with the number of downloading course documents ($r = .105$; $p < .05$) and with their gender ($r = .100$; $p < .05$). The highest correlation between the independent variables was between the duration of watching the course videos and the duration of live attendance in the course ($r = .725$; $p < .01$). No significant relationship was found between students' academic achievement scores and their grade levels ($r = .014$; $p > .05$). In this sense, hierarchical regression analysis was conducted to determine to what extent the variables of Attending Course Live and from the Archive and Duration of Watching Course Videos, Number of Downloading Course Documents, which are among the online learning activities of students and gender predicted academic achievement scores. Analysis results are given in Table 4.

Table 4. Hierarchical Regression Analysis Results of Students' Online Course Attendance Activities and Gender on Predicting Academic Achievement Scores

Model	R	R ²	ΔR^2	β	t
1 Fixed	.243	.059	.057		86.054**
Live Course Attendance				.243	5.278**
2 Fixed	.265	.070	.066		71.602**
Live Course Attendance				.243	5.288**
Archive Attendance of Course				.104	2.264*
3 Fixed	.268	.072	.066		59.824**
Live Course Attendance				.288	4.310**
Archive Attendance of Course				.101	2.190*
Watching Course Videos				-.062	-.927
4 Fixed	.269	.072	.064		53.818**
Live Course Attendance				.283	4.204**
Archive Attendance of Course				.098	2.100*
Watching Course Videos				-.067	-.988
Downloading Course Documents				.025	.509
5 Fixed	.269	.073	.062		41.265**

Live Course Attendance	.287	4.015**
Archive Attendance of Course	.098	2.099*
Watching Course Videos	-.068	-1.000
Downloading Course Documents	.026	.529
Gender	.008	.166

Dependent Variable: Academic Achievement Score, * $p < .05$, ** $p < .001$

According to Table 4 following the hierarchical regression analysis, first “live course attendance” ($\beta = .243$; $t = 5.275$; $p < .001$) and then “live course attendance” ($\beta = .243$; $t = 5.288$; $p < .001$) together with duration of “archive attendance of course” ($\beta = .104$; $t = 2.264$; $p < .05$) statistically and significantly predict academic achievement scores of students. It is seen that other variables (watching course videos, downloading course documents and gender) included in the model in the 3rd, 4th and 5th steps did not significantly predict the academic achievement scores of the students. While the variable of “live course attendance”, which contributed statistically to the model, alone explained 5.7% ($\Delta R^2 = .057$) of the total variance, the additional contribution (0.9%) of the “archive attendance of course” variable included in the analysis in the second step was low. However, they increased the total variance in academic achievement scores to 6.6% ($\Delta R^2 = .066$).

CONCLUSION

In this research, which analyzes the relationship between some activities in the online learning environment and the academic achievements of Physical Education and Sports School students, positive and significant relationships were found between the academic achievement scores of the students and the duration of watching the courses live, watching from the archive, watching the course videos, the number of downloading the course documents and the gender of students. No significant relationship was found between the academic achievement scores of the students and their grade levels. As a result of the hierarchical regression analysis organized regarding the extent to which the variables with significant relationships predict the academic achievement scores, it was concluded that first “live course attendance” and then, “live course attendance” and “archive attendance of course” significantly predicted the academic achievement scores of the students, but the level of prediction remained low. On the other hand, it was also established that the variables of watching the course videos, downloading course documents and gender did not significantly predict the academic achievement scores of students.

Since studies reveal the relationship between interaction data in online learning environments and students' academic performance (Cristobal et al., 2013, cited in Akçapınar et al., 2016), a positive relationship between students' activity level in online learning environments and their academic performance is an expected situation (Akçapınar et al., 2016). In this context, it is seen in the literature that there are consistent results in the light of the findings obtained from the research. In the study of Akçapınar (2014) in which he tried to model the academic performance of students with the data mining approach according to the interaction data in the online learning environment, it has been concluded that students who are less active in the online learning environment exhibit low success in the course while students who are highly active exhibit high success in the course. There are also other studies that reached the same conclusion (Özbay and Ersoy, 2017; Whitmer et al., 2012; Yıldırım, 2018). As explained at the beginning, it is expected to achieve such results.

Research findings in which academic achievement in online learning is discussed from different perspectives are also in line with current research findings. In the research of Kurnaz and Ergün (2019) in which they examined the relationship between learning styles and academic achievement in e-learning environments, they have found that attending online classes, watching video recordings, active learning style and independent learning style predict academic achievement in the e-learning environment. In the current study, the duration of “live course attendance” and “archive attendance of course” significantly predicts the academic achievement scores of the students. It is stated in the study of Tuğtekin (2022) that while students' grade level and the time they spend in the online learning environment do not make a difference in their online self-regulation levels, they have an effect on their academic achievement and attendance in learning activities. In the study of Kaplan and Alkan (2022), in which the effects of distance education on student achievement during the global epidemic process are discussed with a qualitative approach, it is observed that student success is negatively affected by various reasons such as equipment problems, interest and attention problems, and situations such as teaching abstract subjects, following lessons and active participation are associated with failure in the distance education process. Güneş et al. (2017) have analyzed learner-content interactions by analyzing the enrollment logs of 426,211 students in mass distance education in the example of Anadolu University Open Education system, and concluded that learner-content interaction is an important variable in explaining academic achievement.

In the distance education process, many factors (cognitive, affective, technological infrastructure, psychological, etc.) can directly or indirectly affect the online learning performance of students or mediate their performance. As

a result, by considering some of the students' online learning activities and demographic characteristics, their relationship with their academic achievement grades was tried to be analyzed by quantitative method and a conclusion was reached in this research. Due to this limitation of the research, more in-depth results can be obtained by conducting new studies with a quantitative or qualitative approach with the control variables that may affect the academic achievement of students in online learning, according to different types of activities and interactions, or with the control variables that can affect academic achievement in online learning.

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