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VIRTUAL CLASSROOMS IN DISTANCE EDUCATION: AN EXAMINATION OF VIRTUAL CLASSROOM EXPERIENCES

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Abstract: This study examines the virtual classroom experiences of graduate students. Virtual classroom applications related to the course "applications of scientific research" taught at a state university were treated as a case study. Virtual classroom recordings, defined using the university's learning management system, were used as research data. The study data consisted of virtual classroom recordings created throughout the academic term, shared documents, students' synchronous participation statuses in classes, completion statuses of virtual class activities, watching statuses of live lessons, preparation statuses for shared documents, and instant messaging during synchronous virtual classroom experiences. Content analysis was used to analyze the data. The virtual classrooms encompass 45 students, including 30 females and 15 males, who took the course 'Scientific Research Practices' at a state university during the 2020–2021 academic year at the postgraduate level. The results show that effective and well-managed virtual classrooms enabled students to participate simultaneously. Virtual classrooms facilitated the development of a sense of community among students, and these students adhered to the norms typically observed in a physical classroom. Conducting an effective educational process in virtual classrooms is closely linked to the instructor's skills. Furthermore, the technical issues encountered did not significantly impact the educational process negatively.

Key words: case study, distance education, learning communities, online learning, virtual classrooms.

Introduction

The rapid development and change in information technologies removes physical boundaries in educational environments and increases the interest in distance education applications. However, the suspension of face-to-face educational activities during the pandemic period revealed that meeting the educational needs of individuals solely through face-to-face education is not always feasible. This realization underscored the importance of distance education applications. Therefore, educational institutions should actively use information and communication technologies, support traditional education environments with online courses, and engage in distance education activities.

Distance education is a learning process in which the learner and the teacher are present at different places and times and takes place in a planned learning-teaching environment, that ensures communication and presentation of content through digital methods (Moore & Kearsley, 2011). It is a form of teaching in which different technologies are used to communicate synchronously or asynchronously (Koloğlu et al., 2016). Distance education is an interdisciplinary field that attempts to eliminate the limitations between the learner and instructor by using technological opportunities with a pragmatist approach (Bozkurt, 2017). With distance education, students can carry out their education life independently of place and time by using different technological equipment via the internet.

Distance education can be carried out synchronously and asynchronously. Asynchronous education platforms are educational platforms in which the instructor and student can take part in the education process independently of each other. Synchronous education platforms, on the other hand, are systems in which simultaneous learning environments are used. In these systems, the instructor and student can communicate using web 2.0 technologies such as video conference, e-mail, chat, blog, and forum regardless of time and place (Vonderwell et al., 2007). In synchronous learning environments, voice,

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image, and data communication can be mutually realized between users through virtual classroom applications (Falowo, 2007).

Virtual classrooms are communication systems that enable a group of people to learn together and help them understand, and are interactive multi media environments that facilitate learning regardless of time and space constraints. (Tiffin & Rajasingham, 1995). Clark and Kwinn (2007) describe virtual classrooms as online environments, where students in different environments come together synchronously under the guidance of an instructor. In virtual classroom applications, learners and instructors, who are physically in different locations, teach simultaneously via the internet (Lavolette et al., 2010). Virtual classroom software is generally used by integrating it into learning management systems. After synchronous lessons are taught in virtual classrooms, video recordings of the lessons are recorded in the learning management system. Virtual classroom systems offer numerous advantages, including flexibility in terms of time and location, equal opportunities, the ability to review content as needed, participation through cameras or microphones, synchronous information sharing among participants, and the sharing of documents and screens.

Virtual classroom software is very important for the distance education process. To reach the goals of higher education, it is necessary to take advantage of open and distance education. Universities use different learning management systems to enable students to be involved in the educational process from different environments. Virtual classroom applications are actively used in distance education programs of universities at the associate, undergraduate, and graduate levels. In these programs, courses are taught in virtual classroom environments synchronously every week throughout the semester.

The literature concerning virtual classrooms encompasses a range of studies, including metaphorical perceptions towards virtual classrooms (Erten, 2020), technologies used for virtual classroom applications (Ergüzen & Erol, 2017; İzmirli & Akyüz, 2017), learning management systems used in universities (Kocatürk & Uşun, 2020; Mishra et al., 2020), the effect of virtual classroom practices on student motivation (Bulic & Blazevic, 2020), anxiety and satisfaction levels of virtual classroom students (Abdous, 2019; Alzahrani & Seth, 2021), attitudes towards online education (Boca, 2021; Çakır & Arslan, 2020), perceptions towards open and distance education (Azhar & Iqbal, 2018), opinions on e-learning (Chakraborty et al., 2021; Liaw et al., 2007; Yilmaz, 2015), problems encountered in synchronous distance education (Kırmacı & Acar, 2018; Leontyeva, 2018), factors affecting the success of e-learning (Agrawal et al., 2016; Erdilek Karabay et al., 2020), and classroom management in virtual classrooms (Arslan & Şumuer, 2020; Yılmazsoy et al., 2018). However, no study has been found to clearly reveals the existing situation by examining the records, documents, and instant messaging related to the virtual classrooms held throughout the academic year.

This study aims to examine the virtual classroom experiences of postgraduate distance education students. Considering that one of the major criticisms directed at distance education systems revolves around students' classroom experiences and interactions'(Rosen & Salomon, 2007), we believe that investigating students' simultaneous experiences in virtual classrooms will provide a meaningful contribution to the existing literature. To examine the process of ongoing education in virtual classrooms during an educational period, we collect students' participation in virtual classrooms, their completion of virtual classroom applications, their status of re-watching live lessons, their preparation for virtual classroom documents, their passing grades and positive and negative statements expressed in virtual classroom processes. This study, which was conducted using the virtual classroom recordings directly without any intervention in the students' virtual classroom processes, clearly reveals the reality of the effectiveness of virtual classroom applications. Through such studies that reveal the success and effects of virtual classroom processes, the roles and competencies of virtual classroom instructors and students will be determined. In this way, educational institutions and trainers will be given the opportunity to self-assess. We believe that these studies constitute a crucial step in shaping arrangements for virtual classroom courses, and the research results will illuminate efforts aimed at designing and utilizing virtual classroom environments. Within the scope of the research, the following questions were directed:

- How is synchronous student participation in virtual classroom applications?

- How is the students' completion of virtual classroom applications?
- Are students reviewing live lessons?
- How are students preparing for shared documents in the virtual classroom?
- What are the positive statements expressed in synchronous virtual classroom processes?
- What are the negative statements expressed in synchronous virtual classroom processes?
- What is the passing grade distribution of students enrolled in virtual classroom applications?

Material and method

Research design

Case studies are researches that have limitations and allow examination of certain details in depth (Sığrı, 2018; Yin, 2014). A case study is a detailed description and analysis of a closed system. A closed system can be a phenomenon of a single person, group, community, program, specific practice, or institution (Merriam & Tisdell, 2015). In case studies, a system, individuals, or groups that are created in line with a certain situation are examined in their own unique environment. The case study is a form of qualitative research aimed at examining processes and discovering their meanings (Lodico et al., 2010; Yin, 2014).

Virtual class participants

The created virtual classrooms consist of 45 students, 30 women and 15 men, who took the Scientific Research Applications course at the postgraduate level in a state university in the 2020–2021 academic year.

Case study: virtual classroom applications

Virtual classroom applications created for the Scientific Research Applications course during the spring semester of the 2020–2021 academic year were chosen as a case study.2020–2021The virtual classrooms were defined using the learning management system of the university where the study was conducted. Learning management systems are platforms that are used in the distance education processes that allow teaching regardless of the time and place, repetition of instructions, assessment and evaluations, and use of communication tools. They include messaging tools to enable participants to communicate with each other and with the instructor. They also present features such as session recording to provide an opportunity for those who could not attend the session or those who want to rewatch the session. The instructor of the course can add activities such as homework, exams, virtual classrooms, documents, and videos for a course through the learning management system.

The virtual classes are created every week within the scope of the Scientific Research Applications course. The created virtual classrooms were conducted as 3 lessons per week for 13 weeks in the spring semester of the 2020–2021 academic year.

During the 17-week education period, virtual classrooms were suspended during the midterm exam week (8th week), final exam week (17th week), and public holidays (12th week and 13th week). Virtual classes continued for 13 weeks in total.

Through the Advancity Learning Management System (ALMS), different documents were shared each week by the instructor of the course to support the content of the educational process. Students were asked to conduct research on the shared documents before participating in the virtual classes. During the educational process, discussion and question and answer methods were mainly used to make the students as active as possible.

Data collection process

The document analysis method was used to collect the research data. For this, a login is made with the username and password of the course lecturer to the learning management system used by the university for distance education, where the case study was carried out. After that, the contents of the virtual classrooms created in the Scientific Research Applications course given in the spring semester of the 2020–2021 academic year have been downloaded. The following are used as research data: Virtual classroom records created during the academic year, shared documents, synchronous attendance of students, completion of virtual classroom activities, live lessons review, preparations for shared documents, instant messaging during the synchronous virtual classroom experiences, and students' passing grades. No personal information was shared in this study, and we acted in accordance with publication ethics.

No explanation was given to the virtual classroom participants that the virtual classroom processes would be used in a research context. In this way, it aims to reach students' natural interpretations and examine the natural course of the virtual classroom process.

The approval for the current study project was obtained from the Ethics Commission of Social Sciences of Dicle University with the date of the ethical evaluation decision 06.07.2021 and the ethical evaluation document number 06.07.2021—122.

Analysis of data

Content analysis was used in the analysis of the research data. Content analysis is generally used to systematize and analyze data obtained using qualitative data collection tools (Fraenkel et al., 2012). According to Neuendorf (2020), content analysis is an observational research method used to systematically evaluate the real and symbolic content of all recorded forms of communication. With content analysis, valid and meaningful inferences can be made about texts and the contexts in which they are used (Krippendorff, 2004).

The data obtained in this study were analyzed and coded according to the defined categories. To ensure the consistency of the results obtained after the analysis of the qualitative data, it is stated that the coding can be reviewed by the same coder after 10-14 days (Flick, 2014). To ensure coding reliability, the analyzes were repeated 10 days later. The reliability coefficient between the two codings was calculated using Miles and Huberman's (1994) formula (consensus/consensus+disagreement), and the coding consistency was found to be 93%. According to Miles and Huberman (1994), a reliability value over 80% indicates that the research is reliable. Therefore, the obtained coding consistency was accepted as reliable for this study.

Graphs and tables were used to make the findings more comprehensible. The findings, which were brought together within the framework of certain concepts and themes, are supported by direct quotations. Virtual class participants are named with a "K" prefix and numbers to protect their anonymity.

Findings

In this section, the findings obtained from the analysis of the research data are presented.

How is synchronous student participation in virtual classroom applications?

Synchronous participation of graduate students in virtual classroom practices was examined and the findings are presented in Figure 1.

Figure 1 shows that the students participated in the virtual classroom practices, which were held weekly during the term, at rates ranging from 64% to 47%, and the participation rate was 42% only in the last lesson of the term. During the first 6 weeks, students took part in virtual classes synchronously at a rate of 51% and above.

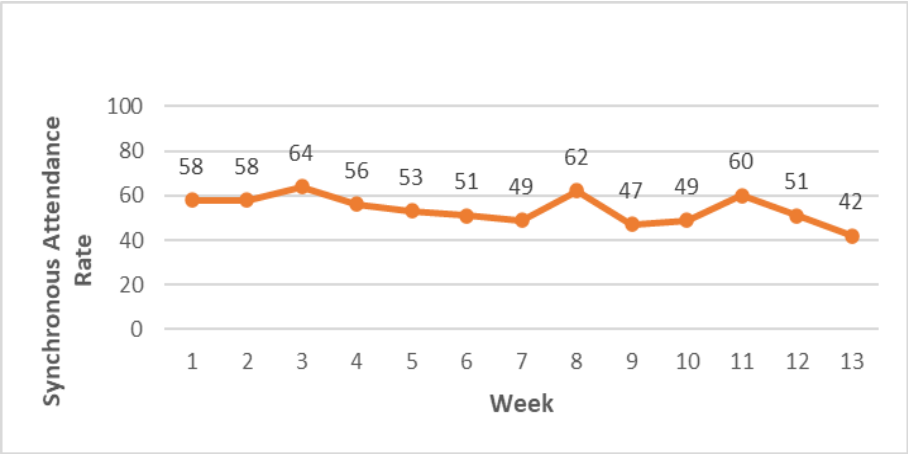

Figure 1. *Students' synchronous participation in virtual classroom applications*

How is the students' completion of virtual classroom applications?

Students' completion of virtual classroom applications was examined, and the findings are presented in Figure 2.

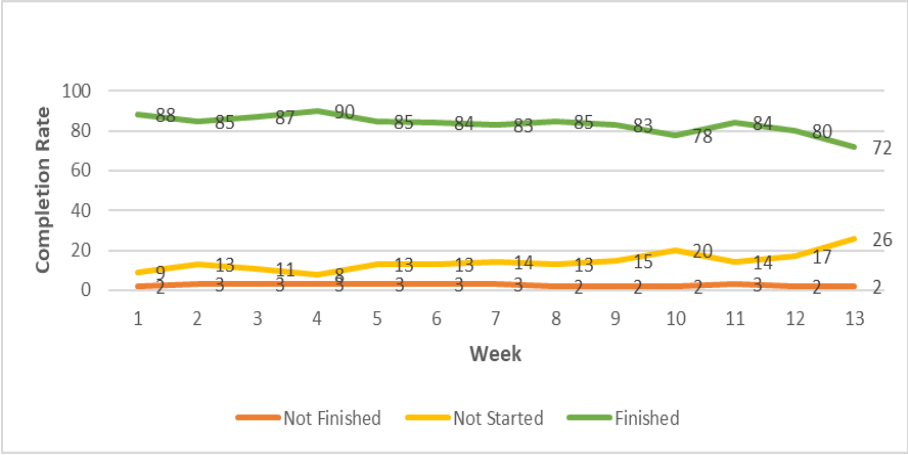

Figure 2. *Students' completion of virtual classroom applications*

Figure 2 shows that the students completed virtual classroom applications at rates ranging from 90% to 78% on a weekly basis, while the last virtual classroom application of the term had a 72% completion rate. In addition, virtual classroom applications were not started at rates ranging between 9%-17% each week, and 26% in the last week of the term. Furthermore, it was found that virtual classroom applications were not completed at rates ranging from 2%-3% every week.

Are students reviewing live lessons?

Students' re-watching of the live lessons were examined, and the findings are presented in Figure 3.

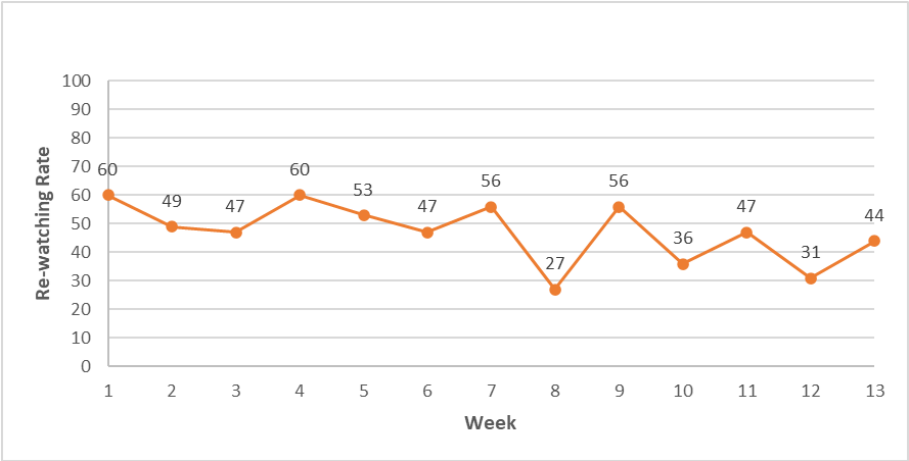

Figure 3. *Students' re-watching of the live lessons.*

Figure 3 shows that most live lessons (10 weeks) that were held for 13 weeks were rewatched at rates of 44% and above. Throughout the term, the rewatching rates varied between 60% and 27%.

'How are students preparing for shared documents in the virtual classroom?

Students' preparations for the shared virtual classroom documents were examined, and the findings are presented in Figure 4.

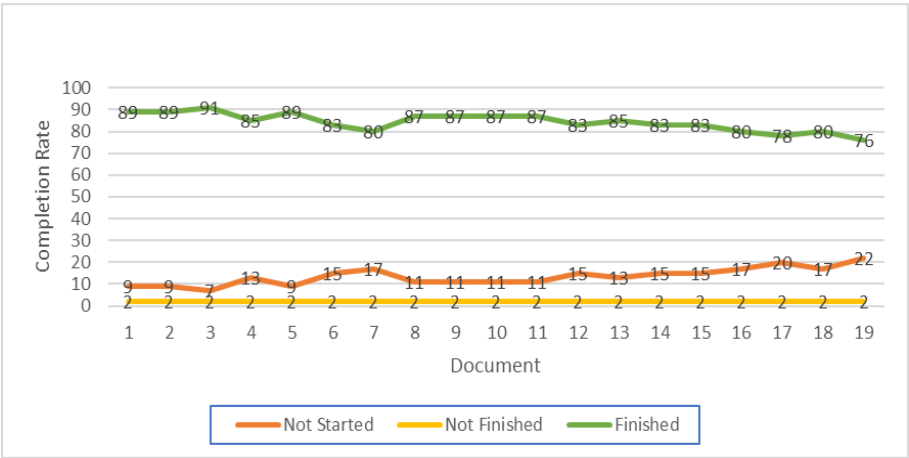

Figure 4. *Students' preparations for the shared virtual classroom documents*

Figure 4 shows that students completed the document activities by making the preparations specified in the shared virtual classroom documents, at varying rates between 91% and 76%. In addition, shared virtual classroom document activities were not started at rates varying between 9%-22% each week. Furthermore, it was found that shared virtual classroom document activities are not completed at a rate of 2-3% every week.

What are the positive statements expressed in synchronous virtual classroom processes?

The chat logs of postgraduate students over the learning management system they used during their synchronous virtual classroom processes were collected and analyzed. As a result of the analysis, the positive situations statements in the synchronous virtual classroom processes were categorized into three sub-themes and 28 codes. The obtained results are presented in Table 1.

Table 1. *Positive statements expressed in synchronous virtual classroom processes.*

Theme	Sub-theme	Code
Positive statements	Instructor-related	Having high intrinsic motivation
		Finding students' shortcomings
		Ability to plan the educational process properly
		Using repetition
		Providing interaction
		Coming prepared for virtual classes
		Having good communication skills
	Student-related	Having high intrinsic motivation
		Ability to think critically
		Coming prepared for virtual classes
		Taking an active role in the educational process
		Boost in self-confidence during the educational process
		Covering lack of knowledge.
		Having high satisfaction levels
		Have a sense of belonging to the class
		To be able to express their problems/requests for the course
	Educationa process-related	Arousing curiosity in students
		Having a good time
		Efficient conduction
		Contribution of the course to different courses
		Following classroom rules
		Supporting the cultural process
		Developing a critical perspective
		Using repetitions
		Ensuring the active participation of students
		Being a democratic platform
		Using the question and answer method
		Using the discussion method

Table 1 shows that the positive statements expressed in synchronous virtual classroom processes are grouped into 3 subthemes: Instructor-related, student-related, and educational process-related. There are 7 different codes related to the instructor subtheme, 9 different codes related to the student subtheme, and 12 different codes related to the educational process subtheme.

Chat logs examples of the instructor-related subtheme expressed in synchronous virtual classroom practices are as follows.

K2_18:05	"Professor has nicely planned how she will conduct the lesson :)"
K25_18:05	"Like, I understood your sensitivity toward the lesson."
K35_17:31	"Professor, you don't waste even a minute, mashallah 😊"
K2_18:29	"You have been explaining how we should look in such details for weeks that thanks to you again."
K8_21:34	"Thank you for your interest and efforts, Professor."

Chat log examples of the student-related subtheme expressed in synchronous virtual classroom practices are as follows:

K32_18:37	"But it's going very well, professor 😊" (States the enjoyment of the course process)"
K40_18:16	"We are ready for all 😊 (States that he/she came to lesson prepared)
K2_18:52	"I would like to do a qualitative study with you professor, hopefully, kismet:)"
K35_17:32	"I look forward to your lesson."
K7_18:43	"Every week, we read the works you have already uploaded."
K39_17:51	"Don't worry professor, we have an active class."
K32_18:26	"The findings are classified, but I think they are very shallow, Professor." (Talking about the evaluated article)

Chat log examples of the educational process-related subtheme expressed in synchronous virtual classroom practices are as follows:

K39_18:26	"I have to leave, excuse me professor ☹" (Classroom rules are followed)
K40_18:54	"Thanks to you Professor, now I understand better what I should pay attention to in my project."
K25_18:00	"I think this course will contribute to our graduation project, professor."
K10_18:35	"Thank you, Professor. This information proved to be very helpful"
K6_18:51	"Professor, your lecture was very fruitful for us."
K28_18:05	"I see this class as beneficial, professor. You are very energetic, I think I will learn a lot from you"
K25_17:58	"Repetitions are just great, professor"
K24_19:04	"Thank you. Our lesson was very enjoyable, thanks to our friends, too."
K5_19:05	"We look forward to every lesson, Professor."

What are the negative statements expressed in synchronous virtual classroom processes?

The chat logs of graduate students during their synchronous virtual classroom processes were analyzed, and the negative statements expressed were categorized into 3 subthemes and 11 codes. The obtained results are given in Table 2.

Table 2. *Negative statements expressed in synchronous virtual classroom processes.*

Theme	Sub-Theme	Code
Negative statements	Infrastructure and hardware-related issues	The lack of knowledge about using technological devices
		Internet connection problem
		Browser problems
		The lack of hardware and hardware malfunction
		Systemic Errors
	Environment-related issues	Professional responsibilities
		Other responsibilities (like taking care of children, cooking)
	User-related issues	Class passing anxiety
		Self-confidence problem
		Stress caused by responsibilities related to lessons
		The lack of knowledge

When examining Table 2, it can be seen that the negative statements expressed in synchronous virtual classroom processes are grouped into 3 sub-themes: Infrastructure and hardware-related issues, environment-related issues, and user-related issues. There are 5 different codes under the infrastructure and hardware-related issues sub-theme, 2 different codes under the environment-related issues sub-theme, and 4 different codes under the user-related issues sub-theme.

Chat logs examples on "infrastructure and hardware-related issues" expressed in virtual classroom synchronous processes are as follows:

K6_18:21	"Professor, your voice is hoarse"
K28_18:35	"Professor, the video connection is lost."
K34_17:35	"It was messing up when I watched the recordings"
K8_17:36	"A system check needs to be done"
K32_18:06	"No professor, I can't open it."
K39_17:34	"Professor, my microphone is broken :)"
K19_18:32	"There is an echo, professor."
K15_17:59	"Professor, I'm responsible for the second article, but there is a problem with my camera"
K25_17:52	"We formatted the computer, that's why it won't work"

Chat log examples on "environment-related issues" expressed in synchronous virtual classroom processes are as follows:

K6_17:53	"Professor, some friends can't attend because this overlaps with their live classes"
K11_17:38	"it's little busy" (talking about the workload)

K4_18:17	"I think the tiredness of the day has descended on all of us"
K25_18:49	"We are listening to you in the kitchen" (He/she states that he/she has to do his/her work in the kitchen while listening to the lecture)
K7_18:49	"I both work in the kitchen and listen :)"
K39_18:26	"I beg your pardon, professor, I have to leave"
K44_18:35	"Professor, we are experiencing end-of-term mental fatigue."

Chat log examples on "user-related issues" expressed in synchronous virtual classroom processes are as follows:

K38_18:04	"Professor is there anyone who failedthe project assignment?"
K7_17:59	"Professor, unfortunately, I need to collect data for my project too, and I am already stressed about how to collect data"
K4_18:48	"We do not have self-confidence because of our lack of knowledge, professor"
K35_18:24	"Personally, I don't know anything about data analysis, professor"
K42_19:08	"Yes professor, I'm worried that I may not find it"

What is the passing grade distribution of passing grades of students enrolled in virtual classroom applications?

The distribution of the passing grades obtained by taking 40% of the midterm exam grades and 60% of the final grades of the students enrolled in the virtual classroom applications was examined, and the findings are presented in Figure 5.

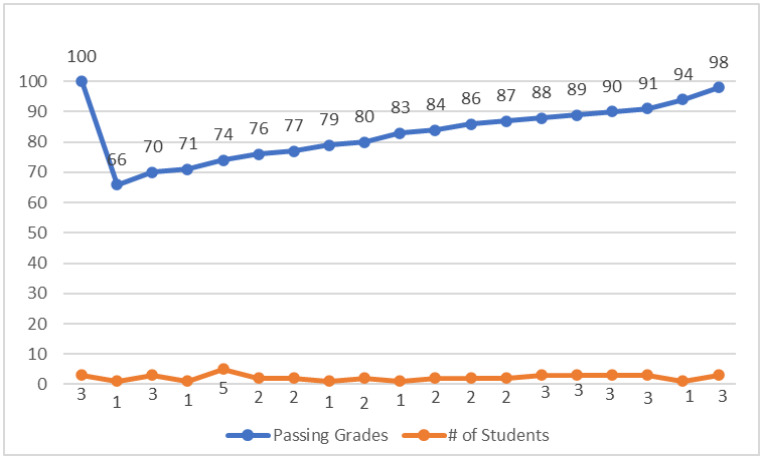

Figure 5. *Distribution of passing grades of students enrolled in synchronous virtual applications. Note: Two students that did not take the exams are not included in the chart.*

Figure 5 shows that the passing grades of the students who took the exams varied between 70 and 100, and only 1 student passed with a grade of 66. In addition, the average passing grade of students was found to be 79,15.

Discussion and Conclusion

To ensure the effectiveness of distance education, which has a very important place in today's educational process, it is very important for students to attend live classes, communicate instantly with the instructor about the unclear issues that are not clear, and have an active role in the educational process. In some studies, in the specialized literature, it has been stated that the participation rate in live courses is low (Bailey & Card, 2009; Dinçer & Yeşilpınar Uyar, 2015), and the instructors mostly complain about this (Bilgiç & Tüzün, 2015; Sümer, 2016). In the current study, students participated in their weekly virtual classroom practices throughout the term at rates ranging from 64% to 47%, while the participation rate was 42% only in the last class of the term. In the first 6 weeks, students synchronously participated in virtual classes at rates of 51% and above. Students' attendance at ive

classes can be explained by ' the effectiveness and enjoyment of virtual classroom applications, student input, and ability to increase students' internal motivation. In fact, students clearly expressed this situation in their instant messages in virtual classrooms. In addition, different responsibilities were given to students by regularly sharing documents with them every week in virtual classroom sessions. The different responsibilities that were given to the students regularly may also have enabled their synchronous participation in virtual classroom practices. Conversely, after analyzing the content of the virtual classrooms, it becomes evident that participants occasionally encounter challenges in attending live classes due to their professional, school, and family commitments. These responsibilities significantly influence students' active participation in virtual classrooms.

By recording live lessons conducted through virtual classroom applications in the learning management system, students can complete the lesson whenever they want. Thus, a structure can be created that allows for individualized and asynchronous education according to the students' needs. In the current study, virtual classroom applications were recorded in the learning management system. This approach provided students with the flexibility to access the virtual classroom content at their convenience. The findings indicated that student completion rates for the virtual classroom applications ranged from 78% to 90%, with the final virtual classroom application of the term having a completion rate of 72%.

Recording virtual classroom sessions and supplying them as asynchronous course material is a very important opportunity to re-view/view missed classes. By recording the live lectures and accessing them on demand, students can watch the video recordings of the lectures again and again. In this study, it was found that most virtual classroom practices (10 weeks) carried out for 13 weeks were re-viewed at rates of 44% and above. This result can be interpreted as a sign that students need to watch the live lesson recordings again, that they use the live lesson recordings as digital educational material, and that this helps them in the learning process.

Students should take the same responsibility in distance education courses as they do in face-to-face education. (Boettcher, 2011; Lehman & Conceicao, 2010; Simonson et al., 2014). For students to learn effectively in virtual classroom environments, they should be responsible for completing various tasks and assignments during the learning process. Within the virtual classroom activities used in this research, documents were shared with students on a weekly basis, and various responsibilities were assigned to them. Students were found to complete the documentation activities by following the instructions outlined in the shared virtual classroom documents, achieving high completion rates that ranged from 76% to 91%. This result can be explained by the fact that the participants in the virtual class were higher education students.

Analyzing the content of the live course, the effectiveness of the educational process and the roles and competencies of instructors and students in the virtual classroom are determined.

The analyzed live lesson contents were grouped under 2 main themes as positive and negative statements. The positive statements expressed by the students were grouped under three sub-themes: instructor-related, student-related, and educational process-related. Under the related to instructor sub-theme, the following codes were found: having high intrinsic motivation, finding students' shortcomings, ability to plan the educational process properly, using repetition, providing interaction, coming prepared to virtual classes, and having good communication skills.

Performing an effective educational process on these platforms is directly related to the competencies of the instructor. Instructors should be able to use virtual classroom software effectively and prepare for the class in accordance with the online environment (Ng, 2007). Instructors are expected to have sufficient knowledge and skills in matters such as effective use of materials, effective communication, lesson planning and management, and managing different learning groups. (Roblyer, 2006). As part of this study, participants in the virtual classes expressed through their instant messages that the instructor exhibited high intrinsic motivation, demonstrated an ability to identify students' shortcomings, effectively planned the educational process, incorporated necessary repetitions, engaged well with participants, came well-prepared for the virtual classes, and possessed strong communication skills. Furthermore, both the case study and the case study platform, which are the focus of this study, were previously experienced by the instructor during an earlier educational period. Consequently,

incorporating the instructor's experience and accomplishments in distance education into the current case study paves the way for a more effective educational process.

In the student sub-theme, the following codes were found: having high intrinsic motivation, ability to think critically, coming prepared to virtual classes, taking an active role in the educational process, boost in self-confidence during the educational process, covering the lack of knowledge, having high satisfaction levels, having a sense of belonging to the class, and being able to express their problems/requests of the course.

Bolliger et al., (2010) stated that digital media tools motivate students toward classes in online environments. The study conducted by Gabrielle (2003), stated that the use of teaching strategies in technological environments increased the motivation and individual learning tendencies of learners. Ojo and Olakulehin (2006) stated that students' attitudes toward distance education generally tend to be positive.

Within the conducted study, the following codes were found into the educational process theme: arousing curiosity in students, having a good time, efficient conduction, contribution of the course to the different courses, following the classroom rules, supporting the cultural process, developing a critical perspective, using repetitions, ensuring active participation of students, being a democratic platform, using the question and answer method, and using the discussion method.

Interaction is one of the most important aspects of distance education (Swan, 2002; Wilson & Stacey, 2004). ' Students' missed opportunities for natural social interaction, classroom experience, and academic discussion are among the criticisms leveled at distance education systems. (Rosen & Salomon, 2007). The criticisms directed toward the distance education system are mitigated through features such as instant audio and video interaction, facilitated by the tools of synchronous virtual classrooms. Virtual classroom environments offer opportunities for interactions among learners, between instructors and learners, and with learning content, thereby addressing these concerns. (McBrien et al., 2009; Milosavljević et al., 2008; Schullo et al., 2007).

The case study platform examined in this study can be seen to enhance interaction through features such as document sharing and presentation, video participation, instant messaging, and whiteboard applications. By organizing question-answer activities and fostering discussion environments during live classes, active student participation is effectively encouraged. This situation also increased the lesson comprehension. Indeed, students frequently expressed the effectiveness of the educational process through their instant messaging. Therefore, the effectiveness of the lessons is an expected outcome. This finding aligns with the perspective of Ali et al. (2011), who highlighted the crucial role of student-instructor interaction in the effectiveness and success of distance education methods. Moreover, several authors (Wang, 2008; Yang et al., 2010) note that universities' adoption of online course systems enhances efficiency and brings educational benefits.

With the opportunities they provide, virtual classroom apps help students get to know their friends and create a sense of community. In this way, a social environment is formed on virtual platforms, students act in accordance with the rules of physical classrooms, and they can also keep cultural values alive in virtual classroom environments. Indeed, by analyzing the contents of the virtual classrooms, it was found that students frequently used expressions such as "hello", "get well soon", "congratulations", "good luck", "good evening", "can I go out?", and "I'm late, sorry". It is stated in the literature that there should be rules in virtual classroom environments similar to those found in physical classroom environments, that everyone should follow the set-out rules, and that these rules turn into habits over time and provide gains for students (Yılmazsoy et al., 2018).

When the chat logs of the students in the virtual classrooms were examined, it was found that they made more positive statements about virtual classrooms compared to the negative ones.

Studies have also concluded that learners generally have positive opinions on the learning opportunities offered by virtual classroom software (McBrien et al., 2009). Online education conducted under appropriate conditions is not a disadvantage compared with face-to-face education in terms of academic success (Moore, 2005; Simonson et al., 2014).

This study shows that negative statements expressed in virtual classroom processes are grouped under three subthemes: infrastructure and hardware-related issues, environment-related issues, and user-related issues. The following codes were found into the sub-theme of infrastructure and hardware-related issues: lack of knowledge about using technological devices, internet connection problems, browser problems, lack of hardware and hardware malfunction, and systemic errors. The environment-related issues sub-theme has the following codes: professional and other responsibilities (like taking care of children, cooking). The following codes are included in the user-related issues sub-theme: class passing anxiety, self-confidence problem, stress caused by responsibilities related to lessons, and lack of knowledge.

Similar to the findings of this study, other research in the literature also highlights the potential occurrence of technical issues in synchronous classrooms (McBrien et al., 2009; Ng, 2007; Schullo et al., 2007). Difficulties can emerge due to infrastructure-related problems in internet and computer access, video conferencing challenges, various technical limitations, system integration issues, and display-related problems.(Öztaş & Kiliç, 2017; Sümer, 2016). In addition, it has been stated that there may be problems such as freezing of the screen due to the internet connection, browser not being updated, and microphone failure (İzmirli & Akyüz, 2017), and that these problems may prevent the instructor and students from actively participating in the class (Doggett, 2007; Gillies, 2008; Grant & Cheon, 2007; Roberts, 2009; Turgut, 2011). One of the codes in the theme of negative situations expressed in this research is system errors. It is also stated in the literature that problems arise due to the learning management system and virtual classroom interface design (Dinçer & Yeşilpınar Uyar, 2015; Sümer, 2016). McBrien et al. (2009) state that technical problems arise related to the use of technology in virtual classrooms, but the educational process continues after solving the problems in a short time. Indeed, in this study, technical problems were encountered, but this situation was not strong–enough to have a negative effect on the efficiency of the educational process. Therefore, considering the sub-themes and codes formed after the analysis of the virtual classroom contents, it is possible to state that a well-structured distance educational process is not a disadvantage when compared to the face-to-face educational process, except for technical issues.

A review of the literature reveals that an obstacle in online education is the challenge of effectively attending classes due to the influence of certain individual or environmental factors. (Bilgiç et al., 2011; Sümer, 2016). Hence, it is of utmost importance to maintain a balance between the timing and scheduling of distance education courses for regular students and their other academic commitments or job responsibilities Simonson et al. (2014) also stated in their studies that lesson planners should be aware of the students' situation and that arrangements should be made for this. Similarly, in this study, participants expressed encountering challenges during the educational process owing to their work and domestic responsibilities. The results of this study show that the average passing score of students was 79.15. Furthermore, it has been suggested that virtual classroom applications can be employed by students, exerting a positive impact on their academic achievement. The presence of course recording features in virtual classrooms also allows for the creation of a flexible learning environment, enabling students to learn at their individual pace.A review of literature reveals that students' satisfaction (Chiu et al., 2005; Levy, 2007; Roca et al., 2006) , instructor attitudes and characteristics, lesson structure, group size, feedback, and prior experiences (Almaiah & Alyoussef, 2019; Kim et al., 2019; Volery & Lord, 2000) all appear to influence the e-learning experience. In their study, Paechter et al., (2010) emphasized that students' achievement goals are a crucial factor for success in e-learning.. Similarly, Beaudoin et al., (2009) underscored the significance of intrinsic motivation, increased interaction, and enhanced feedback in shaping students' success.. Research on assignments and feedback in open and distance learning shows that giving feedback motivates students to learn more (Gibbs, 2010). Similarly, within this study, students reported having a strong intrinsic motivation, appreciating the inclusion of repetitions, actively engaging in the learning process, experiencing the question-answer and discussion methods, addressing identified shortcomings, recognizing effective educational planning, and benefiting from facilitated interaction. Furthermore, considering that the participants in the virtual classes are graduate students who voluntarily enroll in the program for specific purposes, it can be inferred that these factors collectively influence their success.

Suggestions

The following suggestions are proposed as a result of this study, which was conducted to examine the virtual classroom experiences of graduate students:

- This study was conducted at the higher education level. Virtual classroom experiences in other education levels may be examined.
- Experiences, problems, and expectations in virtual classroom processes can be examined using different research designs within the scope of different courses.
- Studies can be conducted by supporting students' virtual classroom experiences with student and instructor opinions.
- To prevent technical problems that may occur in virtual classroom processes, it is recommended that users test their hardware (microphone, headset, etc.), software (browser, learning management system, etc.), and internet connections in virtual classroom environments before the synchronous lessons.
- To prevent infrastructure problems experienced in virtual classroom applications, institutions should provide the necessary technical infrastructure and incorporate distance education centers equipped with advanced technologies.

References

Abdous, M. (2019). Influence of satisfaction and preparedness on online students' feelings of anxiety. *Internet and Higher Education*, *41*, 34–44. https://doi.org/10.1016/j.iheduc.2019.01.001

Agrawal, V., Agrawal, A., & Agarwal, S. (2016). Assessment of factors for e-learning: an empirical investigation. *Industrial and Commercial Training*, *48*(8), 409–415. https://doi.org/10.1108/ICT-03-2016-0015

Ali, A., Ramay, M. I., & Shahzad, M. (2011). Key factors for determining student satisfaction in distance learning courses: A study of Allama Iqbal Open University (AIOU) Islamabad, Pakistan. *Turkish Online Journal of Distance Education*, *12*(2), 114–127. https://doi.org/10.17718/tojde.10766

Almaiah, M. A., & Alyoussef, I. Y. (2019). Analysis of the Effect of Course Design, Course Content Support, Course Assessment and Instructor Characteristics on the Actual Use of E-Learning System. *IEEE Access*, *7*, 171907–171922. https://doi.org/10.1109/ACCESS.2019.2956349

Alzahrani, L., & Seth, K. P. (2021). Factors influencing students' satisfaction with continuous use of learning management systems during the COVID-19 pandemic: An empirical study. *Education and Information Technologies*, *26*(6), 6787–6805. https://doi.org/10.1007/s10639-021-10492-5

Arslan, Y., & Şumuer, E. (2020). Classroom Management Problems Encountered By Teachers In Virtual Classes During Covid-19 Pandemic. *Journal of National Education*, *49*(1), 201–230. https://doi.org/10.37669/milliegitim.791453

Azhar, K. A., & Iqbal, N. (2018). Effectiveness of Google Classroom: Teachers' Perceptions. *Prizren Social Science Journal*, *2*(2).

Bailey, C. J., & Card, K. A. (2009). Effective pedagogical practices for online teaching: Perception of experienced instructors. *Internet and Higher Education*, *12*(3–4), 152–155. https://doi.org/10.1016/j.iheduc.2009.08.002

Beaudoin, M. F., Kurtz, G., & Eden, S. (2009). Experiences and Opinions of E-learners: What Works, What are the Challenges, and What Competencies Ensure Successful Online Learning. *Interdisciplinary Journal of E-Skills and Lifelong Learning*, *5*, 275–289. https://doi.org/10.28945/78

Bilgiç, H. G., Doğan, D., & Seferoğlu, S. S. (2011). Current situation of online learning in Turkish higher education institutions: needs, problems, and possible solutions. *TÜBA Higher Education Research/Review*, *1*(2), 80–87. https://doi.org/10.2399/yod.11.080

Bilgiç, H. G., & Tüzün, H. (2015). Problems experienced in higher education institutions web-based distance education programs. *Journal of Open Education Applications and Research, 1*(3), 26–50.

Boca, G. D. (2021). Factors influencing students' behavior and attitude towards online education during covid-19. *Sustainability (Switzerland)*, *13*(13). https://doi.org/10.3390/su13137469

Boettcher, J. V. (2011). *Ten Best Practices for Teaching Online Quick Guide for New Online Faculty*. Designing for Learning. http://designingforlearning.info/writing/ten-best-practices-for-teaching-online/

Bolliger, D. U., Supanakorn, S., & Boggs, C. (2010). Impact of podcasting on student motivation in the online learning environment. *Computers and Education*, *55*(2), 714–722. https://doi.org/10.1016/j.compedu.2010.03.004

Bozkurt, A. (2017). The Past, Present and Future of the Distance Education in Turkey. *Journal of Open Education Applications and Research*, *3*(2), 85–124.

Bulic, M., & Blazevic, I. (2020). The impact of online learning on student motivation in science and biology classes. *Journal of Elementary Education*, *13*(1), 73–87. https://doi.org/10.18690/rei.13.1.73-87.2020

Çakır, R., & Arslan, F. (2020). Investigation of Distance Education Students' Intention to Use Synchronous Virtual Classroom Environments and Their Attitudes towards Distance Education. *International Journal of Turkish Educational Studies*, *8*(15), 114–133. https://doi.org/10.46778/goputeb.732565

Chakraborty, P., Mittal, P., Gupta, M. S., Yadav, S., & Arora, A. (2021). Opinion of students on online education during the COVID-19 pandemic. *Human Behavior and Emerging Technologies*, *3*(3), 357–365. https://doi.org/10.1002/hbe2.240

Chiu, C. M., Hsu, M. H., Sun, S. Y., Lin, T. C., & Sun, P. C. (2005). Usability, quality, value and e-learning continuance decisions. *Computers and Education*, *45*(4), 399–416. https://doi.org/10.1016/j.compedu.2004.06.001

Clark, R. C., & Kwinn, A. (2007). *The new virtual classroom: Evidence-based guidelines for synchronous e-learning*. San Francisco: Jossey-Bass.

Dinçer, S., & Yeşilpınar Uyar, M. (2015). The Problems Related to Classroom Management Encountered in The Process of Using E-Learning Systems and Solution Suggestions. *Educational Administration: Theory and Practice*, *21*(4), 453–470. https://doi.org/10.14527/kuey.2015.017

Doggett, A. M. (2007). The Videoconferencing Classroom: What Do Students Think? *Journal of Industrial Teacher Education*, *44*(4), 29–41.

Erdilek Karabay, M., Şener, İ., Doyduk, H. B., & Türkyilmaz, G. (2020). Investigating The Predictors Of Virtual Learning Success And Satisfaction Of Secondary School Students During Covid-19 Pandemic Restrictions. *Journal of National Education*, *49*(1), 801–829. https://doi.org/10.37669/milliegitim.788029

Ergüzen, A., & Erol, K. (2017). A real time virtual classroom implementation with WebRTC. *Pamukkale University Journal of Engineering Sciences*, *23*(5), 566–572. https://doi.org/10.5505/pajes.2017.96530

Erten, P. (2020). Methaporic Perceptions of Preservice Computer Education and Instructional Technologies Teachers on Virtual Classrooms. *Bolu Abant Izzet Baysal University Journal of Faculty of Education*, *20*(1), 133–148. https://doi.org/10.17240/aibuefd.2020.20.52925-527431

Falowo, R. O. (2007). Factors Impeding Implementation of Web-Based Distance Learning. *AACE Journal*, *15*(3), 315–338.

Flick, U. (2014). The SAGE handbook of qualitative data analysis. In *The SAGE Handbook of Qualitative Data Analysis*. London: Sage. https://doi.org/10.4135/9781446282243

Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2012). *How to Design and Evaluate Research in*

Education. New York: McGraw-Hill.

Gabrielle, D. M. (2003). *The effects of technology-mediated instructional strategies on motivation, performance, and self-directed learning*. [Doctoral Dissertation, Department of Educational Psychology and Learning Systems, Florida State University, USA].

Gibbs, G. (2010). Does assessment in open learning support students? *Open Learning*, *25*(2), 163–166. https://doi.org/10.1080/02680511003787495

Gillies, D. (2008). Student perspectives on videoconferencing in teacher education at a distance. *Distance Education*, *29*(1), 107–118. https://doi.org/10.1080/01587910802004878

Grant, M. M., & Cheon, J. (2007). The value of using synchronous conferencing for instruction and students. *Journal of Interactive Online Learning*, *6*(3), 211–226.

İzmirli, S., & Akyüz, H. İ. (2017). Examining synchronous virtual classroom software. *Journal of Theory and Practice in Education*, *13*(4), 788–810. https://doi.org/10.17244/eku.347815

Kim, H. J., Hong, A. J., & Song, H. D. (2019). The roles of academic engagement and digital readiness in students' achievements in university e-learning environments. *International Journal of Educational Technology in Higher Education*, *16*(1). https://doi.org/10.1186/s41239-019-0152-3

Kırmacı, Ö., & Acar, S. (2018). The Problems of Campus Students in Simultaneous Online Distance Education. *Journal of Theory and Practice in Education*, *14*(3), 276–291. https://doi.org/10.17244/eku.378138

Kocatürk, N., & Uşun, S. (2020). Üniversitelerde Ortak Zorunlu Derslerin Öğretiminde Uzaktan Eğitim Uygulamaları [Distance education applications in teaching common compulsory courses in universities]. *Journal of Open Education Applications and Research*, *6*(1), 8–27.

Koloğlu, T. F., Kantar, M., & Doğan, M. (2016). Öğretim Elemanlarının Uzaktan Eğitimde Hazırbulunuşluklarının Önemi [The Importance of Readiness of Instructors in Distance Education]. *Journal of Open Education Applications and Research*, *1*(2), 52–70.

Krippendorff, K. (2004). *Content Analysis: An Introduction to Its Methodology (second edition)*. New York: Sage Publications.

Lavolette, E., Venable, M. A., Gose, E., & Huang, E. (2010). Comparing Synchronous Virtual Classrooms: Student, Instructor and Course Designer Perspectives. *TechTrends*, *54*(5), 54–61. https://doi.org/10.1007/s11528-010-0437-9

Lehman, R., & Conceicao, S. (2010). *Creating a sense of presence in online teaching: How to "be there" for distance learners*. Jossey-Bass.

Leontyeva, I. A. (2018). Modern distance learning technologies in higher education: Introduction problems. *Eurasia Journal of Mathematics, Science and Technology Education*, *14*(10), 1–8. https://doi.org/10.29333/ejmste/92284

Levy, Y. (2007). Comparing dropouts and persistence in e-learning courses. *Computers and Education*, *48*(2), 185–204. https://doi.org/10.1016/j.compedu.2004.12.004

Liaw, S. S., Huang, H. M., & Chen, G. D. (2007). Surveying instructor and learner attitudes toward e-learning. *Computers and Education*, *49*(4), 1066–1080. https://doi.org/10.1016/j.compedu.2006.01.001

Lodico, M., Spaulding, D., & Voegtle, K. (2010). *Methods in Educational Research: From Theory to Practice* (2nd ed.). Jossey-Bass.

McBrien, J. L., Jones, P., & Cheng, R. (2009). Virtual spaces: Employing a synchronous online classroom to facilitate student engagement in online learning. *International Review of Research in Open and Distance Learning*, *10*(3), 1–17. https://doi.org/10.19173/irrodl.v10i3.605

Merriam, S. B., & Tisdell, E. J. (2015). *Qualitative Research: A Guide to Design and Implementation*. Jossey-Bass.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Sage Publications.

Milosavljević, B., Nikolić, Z., & Mikarić, B. (2008). Virtual-Classroom Free Software – The Comparative Analysis. *16th Telecommunications Forum*, 882–885.

Mishra, L., Gupta, T., & Shree, A. (2020). Online teaching-learning in higher education during lockdown period of COVID-19 pandemic. *International Journal of Educational Research Open*, *1*. https://doi.org/10.1016/j.ijedro.2020.100012

Moore, J. C. (2005). The Sloan Consortium quality framework and the five pillars. *The Sloan Consortium*, 10. http://sloanconsortium.org/publications/books/qualityframework.pdf

Moore, M. G., & Kearsley, G. (2011). *Distance Education: A Systems View of Online Learning* (3rd ed.). Belmont, CA: Wadsworth.

Neuendorf, K. A. (2017). The Content Analysis Guidebook. In *The Content Analysis Guidebook* (2nd Ed.). California: Sage Publications. https://doi.org/10.4135/9781071802878

Ng, K. C. (2007). Replacing face-to-face tutorials by synchronous online technologies: Challenges and pedagogical implications. *International Review of Research in Open and Distance Learning*, *8*(1), 1–15. https://doi.org/10.19173/irrodl.v8i1.335

Ojo, D. O., & Olakulehin, F. K. (2006). Attitudes and Perceptions of Students to Open and Distance Learning in Nigeria. *International Review of Research in Open and Distance Learning*, *7*(1), 1–10. https://doi.org/10.19173/irrodl.v7i1.313

Öztaş, S., & Kiliç, B. (2017). The Evaluation of University Students' Opinions of Teaching the Atatürk's principles and History of Revolution Course with Distance Education (Kırklareli University Sample). *Turkish History Education Journal*, *6*(2), 268–293. https://doi.org/10.17497/tuhed.327979

Paechter, M., Maier, B., & Macher, D. (2010). Students' expectations of, and experiences in e-learning: Their relation to learning achievements and course satisfaction. *Computers and Education*, *54*(1), 222–229. https://doi.org/10.1016/j.compedu.2009.08.005

Roberts, R. (2009). Video Conferencing in Distance Learning: A New Zealand Schools' Perspective. *Journal Of Distance Learning*, *13*(1), 91–107.

Roblyer, M. D. (2006). *Integrating educational technology into teaching* (4th ed.). Pearson College Div.

Roca, J. C., Chiu, C. M., & Martínez, F. J. (2006). Understanding e-learning continuance intention: An extension of the Technology Acceptance Model. *International Journal of Human Computer Studies*, *64*(8), 683–696. https://doi.org/10.1016/j.ijhcs.2006.01.003

Rosen, Y., & Salomon, G. (2007). The differential learning achievements of constructivist technology-intensive learning environments as compared with traditional ones: A meta-analysis. *Journal of Educational Computing Research*, *36*(1), 1–14. https://doi.org/10.2190/R8M4-7762-282U-554J

Schullo, S., Hilbelink, A., Venable, M., & Barron, A. E. (2007). Selecting a Virtual Classroom System: Elluminate Live vs. Macromedia Breeze (Adobe Acrobat Connect Professional). *MERLOT Journal of Online Learning and Teaching*, *3*(4), 331–345.

Simonson, M., Smaldino, S., Albright, M., & Zvacek, S. (2014). *Teaching and learning at a distance - Foundations of distance education, 6th Edition*. Charlotte, NC: Information Age Pub.

Sığrı, Ü. (2018). *Nitel Araştırma Yöntemleri [Qualitative Research Methods]*. İstanbul, Beta Publishing.

Sümer, M. (2016). Investigation of Learners' Opinions Registering Virtual Classes. *Usak University Journal Of Social Sciences*, *9*(3), 181–200.

Swan, K. (2002). Building Learning Communities in Online Courses: the importance of interaction. *Education, Communication & Information*, *2*(1), 23–49.

https://doi.org/10.1080/1463631022000005016

Tiffin, J., & Rajasingham, L. (1995). *In search of the virtual class: Education in an information society*. London: Routledge.

Turgut, Y. E. (2011). *The factors having effect on productivity in lectures via video-conferencing*. [Master's Thesis,Karadeniz Technical University, Institute of Science, Trabzon].

Volery, T., & Lord, D. (2000). Critical success factors in online education. *International Journal of Educational Management*, *14*(5), 216–223. https://doi.org/10.1108/09513540010344731

Vonderwell, S., Liang, X., & Alderman, K. (2007). Asynchronous Discussions and Assessment in Online Learning. *Journal of Research on Technology in Education*, *39*(3), 309–328. https://doi.org/10.1080/15391523.2007.10782485

Wang, G. (2008). Work in progress-preview, exercise, teaching and learning in digital electronics education. *38th Annual Frontiers in Education Conference*. https://doi.org/10.1109/FIE.2008.4720251

Wilson, G., & Stacey, E. (2004). Online interaction impacts on learning: Teaching the teachers to teach online. *Australasian Journal of Educational Technology*, *20*(1), 33–48. https://doi.org/10.14742/ajet.1366

Yang, C., Kuang, X., Li, J., & Wu, Y. (2010). A blending e-learning model for digital electronic technology teaching. *Proceedings of the International Conference on E-Business and E-Government, ICEE 2010*, 5355–5358. https://doi.org/10.1109/ICEE.2010.1340

Yilmaz, O. (2015). The effects of "live virtual classroom" on students' achievement and students' opinions about "live virtual classroom" at distance education. *Turkish Online Journal of Educational Technology*, *14*(1), 108–115. https://eric.ed.gov/?id=EJ1057348

Yin, R. K. (2014). *Case study research: Design and methods*. California: Sage Publications Inc.

Yılmazsoy, B., Özdinç, F., & Kahraman, M. (2018). Investigating Student Opinions about Classroom Management in a Virtual Classroom. *Trakya Journal of Education*, *8*(3), 513–525. https://doi.org/10.24315/trkefd.296409

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