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# Message from the Editor-in-Chief

**Dear Colleagues,**

We are proud to say that TOJET publishes April, 2022 issue.  This issue has international different papers from various fields of educational technology are shared with professionals.  It is a free online journal and offers "Free Access" to all articles.  When the journals are free to access all published articles, it increases the level of impact factor.

TOJET is a multidisciplinary peer-reviewed journal in the field of educational technology. TOJET welcomes the submission of manuscripts that meets the general criteria. TOJET is dedicated to increasing the depth of the subject across disciplines with the ultimate aim of expanding knowledge of educational technology. TOJET is seeking for qualified and high profile researchers to join its editorial team as editors or reviewers.

TOJET thanks and appreciate the guest editors who have acted as reviewers for one or more submissions of this issue for their valuable contributions.  As always, issue v.21 i.2, 2022 features contributions from many countries. Any views expressed in these publications are the views of the authors and are not the views of the Editor and TOJET.

TOJET will organize IETC-2022 (www.iet-c.net)  in North Cyprus. IETC series is an international educational activity for academics, teachers and educators. This conference is now a well known educational technology event. It promotes the development and dissemination of theoretical knowledge, conceptual research, and professional knowledge through conference activities. Its focus is to create and disseminate knowledge about the use of instructional technology for learning and teaching in education.

**Call for Papers**

TOJET invites article contributions. Submitted articles should be about all aspects of educational technology. The articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to TOJET. Manuscripts must be submitted in English.

TOJET is guided by it's editors, guest editors and advisory boards. If you are interested in contributing to TOJET as an author, guest editor or reviewer, please send your CV to tojet.editor@gmail.com.

**April 01, 2022**
**Editors,**
**Prof. Dr. Aytekin İŞMAN**
Sakarya University
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# A Research on Technology Management and its Applications in Schools in the Pandemic Period

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## ABSTRACT
The World Health Organization has labeled the emergence of a coronavirus kind that threatens humanity in Wuhan, China, as a "pandemic" (WHO). The global epidemic has produced severe disruptions in educational possibilities all across the world. This condition highlighted a desire to provide education without attending school, and remote education was established. The demand for online education technologies has also been recognized strongly. The goal of this study is to uncover the use, management, and usefulness of technology in schools before and during the epidemic. The study falls within the purview of descriptive phenomenology design, one of the qualitative research methodologies and the research phenomena is the notion of "technology in accessing education." The research's study group had a total of 24 individuals, 12 principals and 12 instructors. For the research subject, semi-structured open-ended questions were constructed. While pre-pandemic technological tools are used for informational and announcement purposes, as well as the use of interactive boards, it is clear that after the pandemic, education and training applications, as well as all types of information activities, are carried out entirely through technological tools.
**Keywords:** *Education, technology, education management, education technology, pandemic.*

## INTRODUCTION
The World Health Organization (WHO, 2020) has declared that a form of corona virus that originated in Wuhan, China, has begun to endanger people's lives, and so this scenario has been labeled a "pandemic" as of March 11, 2019. The pandemic has resulted in significant changes in health, social, psychological, economic, and educational systems all throughout the world. To struggle with the spread of the Coronavirus (Covid-19) pandemic, countries throughout the world have implemented curfews, travel restrictions, and school closures. Millions of children, teens, and adults were unable to attend school as a result of school closures. This condition is expected to lead to inequities in pupils' access to education in the future (Giannini & Lewis, 2020).

According to World Health Organization (WHO, 2020) data, 243,857,028 Covid-19 cases had been confirmed worldwide as of October 26, 2021, with 4,953,246 fatal cases. According to statistics from the United Nations Educational, Scientific, and Cultural Organization (UNESCO), (2020), schools were closed in 188 nations as of 07 April 2020 owing to the Coronavirus (Covid-19) pandemic. This problem has affected over 1.5 billion children and 63 million educators. This figure represents around 92 percent of the global student population. Nations began to open their schools near the end of 2021, and the number of countries maintaining their schools completely operational continued to rise. According to UNESCO (2021) data, as of 28 June 2021, 119 of 210 nations had fully opened their schools, 56 had partially opened their schools, 16 had taken a break, and 19 had closed their schools (Tedmem, 2021).

Alternative ways of teaching and training have begun to be sought in schools that have been shuttered owing to the pandemic's impact. The necessity for technology in distant education is obvious. With breakthroughs in science and technology, the period we live in is known as the information age. The limit of information and access to it has now altered, and the method of accessing information has risen and become simpler. Expectations from schools varied depending on all of these factors, and in the event of a health problem, these expectations were clearly communicated as a desire for education without going to school. As a result, what is required of today's schools is to create persons who can get information as easily as possible and utilize it as usefully as feasible, and who have the capacity to achieve this all. As a result, the capacity to successfully employ instructional technology comes to the fore. As a consequence of this, many applications are carried out at educational institutions in order to gain from computer technology. The use of many sorts of technical instruments to augment educational environments, not only computers, has begun to acquire significance.

## Pandemic

A novel coronavirus epidemic was first dubbed 2019-nCoV when it was discovered at the Huanan Seafood Market in Wuhan, People's Republic of China, towards the end of December 2019 and became known as "viral pneumonia" reports in the People's Republic of China. This novel coronavirus was eventually called SARS-CoV-2, and the virus-caused clinical illness was dubbed COVID-19. On the same day that WHO designated COVID-19 a pandemic, the first case was recorded in our nation on March 11, 2020. (Hacettepe University, 2021; Dikmen et al., 2020:30). While it originally became apparent in Italy, it is now believed that it has been felt more powerfully across the Americas from December 2020. In order to battle the pandemic, practically all governments throughout the world have implemented curfews, school closures, closures of shopping malls, cafés, and restaurants, and the introduction of various restricted measures in intercity and inter-country movement utilizing public transportation (Saygı, 2021: 112).

## Pandemic and Education

The COVID 19 pandemic is, first and foremost, a major public health emergency. However, as a result of this, it has been noticed that the decision to close all schools at all levels in many nations has resulted in an education crisis. This approach has had a significant impact on many families all around the world. Continuing education and training activities conducted at home have resulted in significant changes not only in the productivity of parents, but also in the social life and educational standing of their children. It is projected that online assessments of instructional circumstances and student work on an unproven and unprecedented scale would have long-term effects for impacted populations. (Burgess et al. 2020). The economy and development status of countries have revealed a noticeable difference in students' access to distance education. While most nations develop various apps using internet infrastructure, several countries have conducted remote education activities using television shows (Ylmaz et al., 2020: 5-6). According to UNESCO studies, fifty-eight nations have postponed tests or altered their exam structures as a result of the epidemic (Can, 2020: 12).

In the process we are in, the epidemic that kills the planet produces a substantial disruption in educational opportunities. This circumstance has an impact on educational activities in schools in a variety of ways. As urgent physical distancing measures disrupt face-to-face education chances at school, education authorities and governments are attempting to develop required alternate education and training alternatives. This method, however, is regarded to function better for youngsters who have parents with a high degree of education, have strong social advantages, and have access to internet resources. Physical departure from school is likely to hinder learning possibilities for many children who lack these opportunities (Reimers, 2020).

In response to the epidemic, China, which has over 270 million pupils, shuttered its schools and transitioned to distant education via online education platforms. Free learning opportunities have been established throughout the country for elementary and secondary school pupils (Ylmaz et al., 2020, p. 7). With the advent of the epidemic in America, Washington University became one of the first colleges to provide an online education environment in which about 50,000 students may access distant education options (Yamamoto and Altun, 2020, pp.27-28). England, as a country that adopted the herd immunity principle at the beginning of the pandemic, thought that higher education institutions would not be affected by this situation. Yet, after the seriousness of the situation emerged, he found the solution in distance education so that the education would not be interrupted. France; He created virtual classrooms by implementing "my class is at home" and switched to distance education applications (Yılmaz et al., 2020, p. 8). When the pandemic's results are explored, it is clear that, in addition to being an epidemic that affects the entire globe, it represents a significant barrier that must be surmounted for mankind and education (Bozkurt, 2020, p. 129).

Turkey is among the countries that determined to close schools throughout the country in order to combat the corona virus outbreak. Schools have been halted by the Ministry of National Education (MEB) as of March 16, 2020, in accordance with the recommendations of the scientific committee. As of March 23, 16 million pupils and 800,000 instructors in K12 schools began the Ministry of National Education-organized and executed online education process. Distance education was supposed to take place between March 23 and April 30, however it was later confirmed that it will extend until May 31, 2020. Simultaneously, as an alternative to traditional teaching and learning settings, the Education and Informatics Network (EBA) and the Turkish Radio and Television Corporation (TRT), which operates a digital education portal, have launched distant education apps. TRT EBA Primary School, TRT EBA Secondary School, and TRT EBA High School were used for these apps, which used TV-based and Internet services offered by three TV channels. The Ministry of National Education has worked with TRT to satisfy the society's educational demands and guarantee that it is not disrupted by the corona virus pandemic, as well as to enhance the EBA's infrastructure. It was determined to conclude the 2019-2020 academic year at the cabinet meeting on May 18, 2020 (MEB, 2020; Ozer, 2020, p. 1124; Başaran et al., 2020, p. 371; Can, 2020, p. 14-15). The Council of Higher Education declared that, owing to the pandemic, the

spring semester courses would be delivered via distance education, and face-to-face instruction will be discontinued as of March 26, 2020 (Ylmaz et al., 2020, p. 11).

The enhancements that have emerged with the inclusion of concepts such as distance education and e-learning in the learning and teaching processes have made technology an integral part of education systems (Polat & Özcan, 2014). The need for educational technology, which is described as the application of education, training, management, communication, and other technologies, has shown itself in order to find answers to the educational difficulties that have occurred as a result of the epidemic.

**Education Technologies and Technologic Leadership**
Educational technology is "a set of systems consisting of personnel, equipment, processes and methods to effectively and positively transform educational theories into practice". (Alkan, 1996). Technological leadership, on the other hand, is to lead in order for these applications to be effective by making the most of the benefits of technology in the context of preparing an effective education and training environment and ensuring its continuity; and must be equipped to meet the requirements of the digital age (Durnalı, 2019). A person should be aware of all the technological developments in his/her field and be able to use this information. In addition, he/she is the person who directs the people around him/her to the use of technology, adapts technology to his field of duty and different areas of life, and organizes those around him in this aspect (Can, 2003; Çakır, 2013; Çıkrık, 2020).

Environmental demands for the efficient use of technology in schools, or the establishment of a "electronic school," have put new responsibilities on educational principals. These may be presented as tasks: acquiring technologies, creating computer laboratories, in-service training of teachers on this topic, bringing computer-trained instructors into the system, and efficiently employing technology in school management (Turan, 2002, p.272). It will be achievable if they are leaders who can leverage technology's capacity to make effective and rational choices, who can use technology at work, and who can communicate effectively with internal and external stakeholders at all levels of the business. School principals with technological leadership competencies; they are the principals who ensure the adaptation of their school to technology, evaluate the existing opportunities to provide new education technologies and seek additional resources. Furthermore, they should be people who monitor their employees' skills in educational technologies and their professional development, follow education and training applications and student evaluations in the technological environment, and use technology in communicating with the school, family, and environment (Adada, Shatila, & Mneymineh, 2017). In certain ways, school principals should be highly digitally literate. Digital literacy is described as knowing how, when, and in what contexts to utilize technology. It is to profit from the internet and technical tools by employing technology in the fulfillment of education (Ribble & Bailey 2007; Akcil, Altinay, & Altinay, 2016), in addition to the abilities to identify the needed material and relevant information.

Understanding the basic concepts of computers and technology, defining software and hardware, knowing the features to consider in the selection and evaluation of them, developing a vision for the use of technology in educational environments, creating resources for technology purchase, determining the priorities and areas of use in this field are all listed in the literature for school principals on technology. (Turan, 2002; Kersley, 1994) "Technology leadership standards" determined by the International Educational Technologies Society (ISTE) in the USA as "National Educational Technology Standards for Principals" (NETS-A) and that should be found in school principals; It is divided into six dimensions: "leadership and vision," "learning and teaching," "productivity and professional practice," "support services," "management and operations," "measurement and evaluation," and "social, legal, and ethical concerns" (Anderson and Dexter, 2005).

To be effective in using technologies in education, instructors must not only understand technology, but also apply technology and innovative teaching methodologies, as well as have the abilities to plan learning activities. As a result, teacher training institutes, in particular, must plan for the use of educational technology in general and information technology in particular (Trans. ; Akpnar, 2003). Cradler (2000) states that; the way to use technology for success in education is realized through planning. Most educators see technology as an important element in the learning-teaching process. Technology is often recommended in schools as a solution for effective learning. It is now accepted that technology affects the success rate by affecting the management style, group behavior, human relations and their motivation in any institution. The importance of technology is more evident in modern and postmodern management approaches. This can be explained as modern and postmodern approaches in management in the digital age (Akcil, Altınay, & Altınay, 2016). Educational technologies make it easier for schools to become learning organizations. The role of information technology in schools as learning organizations: sharing, openness and participatory management. Learning with team spirit, transferring what has been learned and sharing experiences are essential. In line with the objectives of the schools; Collaborative

teaching-learning environments should work to sustain professional development towards entrepreneurship, risk-taking and studies. It is vital for them to integrate knowledge and use educational technologies. So it is because information technology encourages change and improvement (Yikici, Altinay, Dagli, Altinay. 2016: 462-479; Lee, Chng, Coombs, 2004: 363-386; Silins and Zarins, 2002: 24-32).

According to statistics from the United Nations Educational, Scientific, and Cultural Organization (UNESCO, 2020), it is planned to overcome distant education concerns on March 3, 2020. Among his recommendations in this respect are the inclusivity of his programs and the assistance of teachers and families in using digital technologies. To mitigate the negative consequences of school closures, it has been declared that nations would be assisted in ensuring the continuity of distant education for all students by requesting that special steps be implemented for vulnerable and disadvantaged populations. It was requested that the priority of distance education be determined, and that planning be done in accordance with the condition of the pandemic-affected regions, the requirements of the pupils, and the appropriateness of the parents. So what is technology planning? In general terms, technology planning is a continuous cyclical process that transforms a school's technology needs and application methods into concrete behaviors. The planning process guarantees that educational institutions capitalize on technology advancements while minimizing the effect of unanticipated challenges. This procedure serves as guidance for the use of technology in the classroom. The technological strategy, on the other hand, does not drive change. As a result, when the technology plan formulation process, implementation process, and application assessment process are regarded as a whole, they constitute the fundamental aspects of a school reform (Knuth, Hopey, & Rocap, 1996; Saban, 2006).

In contrast, technology integration is the process of bringing instructional technology to all areas of the curriculum in suitable and relevant ways using an interdisciplinary approach (Maddin, 2002; Saban, 2006). The use of technology in academic and managerial activities is also linked to organizational structure (Akcil, Altnay, & Altnay, 2016). According to Ünal Bozcan (2010), training programs on technological advances and effective tool usage should be established for lecturers and students, and these studies should be broadened in collaboration with faculty members of the Computer Technologies Education Department of the faculties. In order for instructional leaders to be effective in the digital age, they need to have features such as taking advantage of the physical resources of schools and information and communication technologies, using school resources effectively and modernizing school facilities (Huong, 2020). It is critical to promote knowledge about the widespread usage of educational technology tools and digital reading aids in the field of education (Odabaş et al.,2019). Given the disruption generated by the COVID 19 Pandemic in educational institutions, it is now vital to move educational settings beyond technical awareness and research and adopt the most effective approaches.

**Purpose of the Research**
Purpose of this research is to reveal the use and management of technology and their effectiveness in schools before and after the pandemic.

**METHOD**
The research was carried out with the phenomenology pattern, one of the qualitative research methods. The purpose of qualitative research is to acquire deeper and more qualified findings by working with a small sample group. Phenomenology, on the other hand, is the description of a phenomenon in line with the experiences of individuals or a group. Phenomenological research can be carried out in two different ways (Ersoy, 2019): "descriptive phenomenology" and "interpretive phenomenology". The primary goal of descriptive phenomenology is to describe the participants' perceptions and sensations of a phenomenon. In interpretative phenomenology, on the other hand, it is attempted to comprehend the participants' reactions to the occurrences. The research phenomenon is the idea of "technology in accessing education," and it falls under the purview of descriptive phenomenology design.

**Limitations of the Research**
All researches focus on a specific place, time and subject and bring some limitations together. Within the scope of this research, it is not possible to look at and evaluate the subject through all educational institutions. Hence, this study was limited to the opinions of randomly selected participants who voluntarily agreed to participate in the research.

**Study Group**
The research attracted a total of 24 participants, 12 principals and 12 instructors. Collins et al. (2006) and Onwuegbuzie and Leech (2007) gathered the study group sizes recommended by several qualitative researchers. According to their review, the minimum number of study groups necessary for qualitative research is six, with a maximum of twelve for focus group assessments. When the number of participants in the focus group interview

is more than 12, each participant may not share their own views and observations and it may be difficult for the researcher to direct the interview; it was stated that when the number of participants is less than 6, it may be difficult to continue the discussion. This research was conducted with 12 teachers and 12 school principals. Some of the interviews were conducted face-to-face and some of them were made with interview forms. Afterwards, they were asked to fill in the interview forms in a quieter and longer period of time, and they were gathered.

**Table 1:** Demographic Characteristics of the Participants

| School Manager Participant Code | Gender | School Type | Vocational Seniority | Teacher Participant Code | Gender | School Type | Vocational Seniority |
|---|---|---|---|---|---|---|---|
| M1 | Male | Secondary | 17 | T1 | Female | Primary | 23 |
| M2 | Male | Secondary | 14 | T2 | Male | High School | 26 |
| M3 | Male | High School | 18 | T3 | Male | Secondary | 24 |
| M4 | Female | Secondary | 10 | T4 | Female | Secondary | 12 |
| M5 | Male | Secondary | 10 | T5 | Male | Primary | 19 |
| M6 | Male | High School | 18 | T6 | Male | High School | 15 |
| M7 | Female | High School | 9 | T7 | Female | High School | 16 |
| M8 | Female | High School | 28 | T8 | Male | Secondary | 10 |
| M9 | Male | Primary | 8 | T9 | Male | Secondary | 8 |
| M10 | Male | High School | 20 | T10 | Female | Primary | 9 |
| M11 | Male | Secondary | 4 | T11 | Female | High School | 7 |
| M12 | Female | Primary | 22 | T12 | Female | Secondary | 8 |

**Data Collection Tools**
For the research subject, semi-structured open-ended questions were constructed. While preparing the questions, another expert was consulted, and a teacher and a management were requested to review the questions submitted by the participants. The final form was created by including the participants' feedback on the quality of the data to be gained from the questions. As a result, the participant checking approach, which is one of the qualitative research internal validity methodologies, was also employed. It is due to the possibility of obtaining different results from the collected data: Because there will be misunderstandings arising from some subjective judgments that the researcher may have, data sources and a data confirmation mechanism will help to understand the reality of the results obtained (Yldrm & imşek, 2013). The major goal of these semi-structured open-ended interview questions was to lessen the researcher's subjectivity by asking the same questions to participants who had comparable features. The validity of the study was assured by mentioning the educators' opinions gathered via the use of codes and categories in the research. On the subject, the following questions were created.

Interview questions prepared for managers;
a) What studies were carried out on information technologies in administrative affairs (teacher board, branch meetings, branch meetings, commissions, etc.) in your school during face-to-face education applications before the pandemic process?
b) What studies have been carried out regarding information technologies in administrative affairs (teacher board, branch meetings, branch meetings, commissions, etc.) in your school during the distance education applications during the pandemic process?
Interview questions prepared for teachers;
a) What studies were carried out on information technologies in education and training in your school during face-to-face education applications before the pandemic process?
b) What studies have been carried out on information technologies in education and training in your school during the distance education teaching applications during the pandemic process?

**Analysis of Qualitative Data**
Face-to-face interviews were conducted with seven principals and teachers during data collection, while the rest were requested to fill in the essential fields by providing the required instructions and utilizing semi-structured interview forms. The opinions of the participants on the studies they conducted in schools were collected using interview forms. Data gathered qualitatively were assessed by employing codes and categorizing them. For the

credibility of the research, the "investigative triangulation" type, which is defined as the involvement of more than one researcher in the collection, analysis and interpretation of the data, and which is one of the reliability methods, was used. Thus, the accuracy of the research results was revealed and the results obtained were strengthened. With the interview forms, the opinions of the participants on the subject were taken from the studies they carried out in their own schools. Qualitatively gathered data were evaluated by using codes and dividing them into categories.

The following phases were used in the examination of the responses given to the semi-structured interview questions when assessing the qualitative study data.
Stage I: The content analysis approach was used to examine the experiences of the participating school principals and teachers with the interview forms. Based on inference, this approach attempts to develop an interpretation based on the elements observed from the data (Bilgin, 2006).
Stage II: The experiences of the participant school principals and teachers on the interview forms were checked by two researchers to see if there were answers to the question asked, and they were classified as positive, negative and partially related to the research questions.
Stage III: As the last stage of the qualitative research, the consistency of the codes created by the two researchers based on the interview questions was determined as "Agreement" and "Disagreement". According to the statements, it was accepted as a consensus for the cases where the same code was preferred and as a difference of opinion when the codes did not match. For such consensus reliability Miles and Huberman (1994):

$$Reliability = \frac{Consensus}{Consensus + Dissensus} \, x100$$

They used the above-mentioned formula. According to this formula, the consensus consistency of the codes regarding the opinions of the school principals is 83.6%, and the consensus consistency of the codes regarding the opinions of the teachers is 87.3%. Yıldırım and Şimşek (2013) explain that the analysis is considered reliable if the consensus consistency of the codes of two different researchers is above 70%.

**FINDINGS AND DISCUSSION**
In this section, the answers given by the participants to the semi-structured open-ended questions in the interviews were analyzed, and the data were given under four themes in line with the four sub-questions of the study. These themes are: (1) the place of information technologies in management before the pandemic process, (2) the place of information technologies in management during the pandemic process, (3) the place of information technologies in education and training applications before the pandemic process, and (4) the place of information technologies in education and training applications during the pandemic process.

**The place of information technologies in pre-pandemic management**
The studies conducted by the school principals on information technologies in management works and processes before the pandemic process are collected in the table below and the frequency of their repetition is given.

**Table 2:** Usage areas of information technologies in pre-pandemic management

| *Manager Views* | *Participant Codes* | *f* |
|---|---|---|
| Information technologies were used to present some data on the subject at the meetings. | M1-M2-M3-M4-M5-M6-M7-M8-M9-M10-M11-M12 | 12 |
| Decisions taken at the meetings and meeting minutes were received in the digital environment. | M1-M2-M3-M4-M5-M6-M7-M8-M9-M10-M11-M12 | 12 |
| Some intra-institutional communications were made by means of informatics. | M2-M4-M9 | 3 |
| Seminars on the use of interactive whiteboards were given. Teachers were allowed to use the interactive whiteboard. | M3-M4-M5-M6-M11 | 4 |
| Before the pandemic, it was not widely used in management works in the field of information technologies. | M2-M10-M11 | 3 |
| Ways of sending and receiving information files through applications such as WhatsApp, Mobile phone, message, e-mail were frequently used. | M2-M4-M9 | 3 |
| Teachers' participation in in-service training courses through EBA was ensured. | M5-M6-M7-M12 | 4 |
| Information was given about EBA Academic support activities and content uploading activities to EBA. | M7-M8 | 2 |
| A school website commission was formed and content preparation | M7 | 1 |

| | | |
|---|---|---|
| information was provided. | | |
| An e-group study was carried out over Mebbis and later this application was abandoned. | M10 | 1 |

In Table 2, it is understood that computer hardware is frequently used in the management works of pre-pandemic schools in order to make presentations on the agenda topics at the meetings and to keep the decisions taken at the meetings and the meeting minutes in a digital environment (f:12). In addition, in-house communication, information and file exchange, Telephone, e-mail, message and WhatsApp, etc. information tools are used. Although it was stated that teachers were informed about the use of interactive whiteboards that entered the schools with the Fatih project and that the use of the boards was monitored by organizing seminars, the rate of school principals (M7, M8) who gave information about the preparation of the content to be used on these boards is very low. It is also stated by four principals that teachers participate in in-service training courses through EBA (M5, M6, M7, M12).

Technological tools used in management before the pandemic period in schools; mostly computers, interactive whiteboards, school web pages, e-mails and phones. It is understood that these are mostly for data storage, presentation and communication purposes, while interactive whiteboards created for educational activities are not used in the field of management, there are also no informative studies for their effective use. It has been determined that most of the school principals use technology for data storage in administration. Regarding the subject, school principals used the following similar statements:

> "Before the pandemic, all boards, meetings, commissions were held face-to-face on designated days and times. Decisions taken, meeting minutes, work done were received in digital environment." M2, M3, M4, M5, M6, M7, M8, M9, M10, M11, M12

It is understood that before the pandemic period, school principals used technology in administrative works for the purpose of making presentations, announcements and information. Regarding this, school principals made the following statements:

> Some in-house communications were made with information tools (M1, M3, M4, M5). We frequently used text messaging methods such as WhatsApp and similar ways of sending and receiving mail such as e-mail (M2). Information on how to upload content to EBA was given (M7). Communication with teachers and students is provided by telephone and WhatsApp (M9, M6, M8, M9, M10, M11, M12).

Deng and Sang (2010) improved an interactive Internet of Things platform, starting from the need to abandon traditional distance education methods. Thus, by creating more teaching scenes, it is aimed not only to interact with learners' learning processes but also to increase the quality of learning. In this context, students in primary and secondary schools in Wuxi city were given online telescope control, enabling them to observe space remotely. In addition, students were allowed to download the pictures they observed, share the data with other students, and collaborate in the learning process (Altınpulluk, 2018).

**Information technologies in management during the pandemic period**
The studies realized by the school principals on information technologies in management works and processes during the pandemic are collected in the table below and the frequency of their repetition is presented.

**Table 3:** Usage of information technologies in management during the pandemic

| Manager Views | Participant Codes | f |
|---|---|---|
| The school's informatics tools were developed and distance education was started. | M1-M2-M3-M4-M5-M6-M7-M8-M9-M10-M11-M12 | 12 |
| Sending all kinds of messages and receiving feedback was done via e-mail, mobile phone, WhatsApp, online surveys in the fastest way. | M1- M2-M3-M4-M5-M6-M7-M8-M9-M10-M11-M12 | 12 |
| WhatsApp groups were created for parents and students at the grade level. | M1- M2-M3-M4-M5-M6-M7-M8-M9-M10-M11-M12 | 12 |
| There has been change and development in the field of informatics. | M1-M2-M9-10 | 2 |
| In-service trainings such as production with informatics, distance education with EBA and digital transformation opened by the Ministry of National | M2-M4-M5 | 3 |

| | | |
|---|---|---|
| Education were encouraged and participation was ensured. | | |
| Distance education was given to teachers about the use of EBA and Zoom programs. | M2-M4-M5-M7-M12 | 5 |
| Teachers' board meetings were held online via Zoom. | M1-M2-M4-M5-M6-M9-M10 | 7 |
| Group teachers' board meetings were held online via Zoom. | M1-M2-M4-M5-M6-M9-M10 | 7 |
| Branch teachers' board meetings were held online via Zoom. | M1-M2-M4-M5-M6-M9-M10 | 7 |
| Parent meetings were held online via Zoom. | M1-M2-M5-M6-M9-M10 | 6 |
| Guidance was given to students and teachers regarding the difficulties encountered in the use of the EBA and Zoom platform. | M7-M8-M9 | 3 |
| By creating a school channel, lecture videos were created and presented to students. | M7 | 1 |

Related to the subject, school principals used the following statements:

"Due to the pandemic rules, all meetings and presentations started to be held online during the pandemic process. In this process, we produced solutions to the problems that we encountered institutionally and individually, and we kept up with the change and development in the field of informatics. We developed the school's informatics tools and made them suitable for distance education. We were able to use the fastest way to send all kinds of messages and receive feedback (message, WhatsApp, online survey, etc.). We switched to distance education, we did all communication on mail, phone, WhatsApp, we created groups. We held the meetings of the teachers' board, the branch teachers' board, the branch teachers' board, and the parents' meetings over Zoom.

"In the pandemic process, information technologies entered our lives in many ways. It has become an indispensable tool in school management, as it is in all areas of life. Distance education has started. All meetings at school have become online. All communication is done via mail, phone, whatsApp. School As a manager, I participated in the trainings opened by the Ministry of National Education (informatics production, distance education with EBA, digital transformation, etc.) in order to adapt to the new situation through in-service training. I also constantly encouraged my teachers in this direction. Teachers' board, branch teachers' board, branch teachers Board of Directors, parents meetings were held via Zoom. The existence of our Computer Formatter teacher provided a plus for our teachers in this process." M2

"Distance education has started. Teachers' board meetings, branch teachers' board meetings, branch teachers' board meetings were held online via zoom. Sending messages and receiving feedback was done via e-mail, telephone, WhatsApp, online surveys. Professional introductions were made. EBA support rooms have been prepared. Teachers were allowed to participate in in-service training seminars through EBA." M3

"Distance education was given to teachers about the use of EBA and Zoom programs and distance education was started. Teachers' board meetings, group teachers' board meetings, branch teachers' board meetings, parent meetings were held via Zoom. WhatsApp groups were created for parents and students at the grade level. Communication was done via e-mail; mobile phone, WhatsApp, online media"M5

"Distance education was given to teachers about the use of zoom programs. Distance education started. First of all, students and teachers were guided about the difficulties encountered in the use of the EBA and Zoom platform. All board meetings were held via Zoom. By creating a school channel, lecture videos were created and presented to students." M7

"Zoom, EBA, WhatsApp were used, student and parent groups were created. All meetings were held online (Zoom). An EBA support point has been established at the school. Teachers and students were informed about the use of EBA and Zoom programs. Distance education was started, while lessons, meetings and announcements were made via EBA, TV, Zoom, WhatsApp, telephone, e-mails." M9

"It was observed that most of our teachers were inadequate in information technologies during the pandemic process. There was an adaptation and procurement process during the first month, but thanks to interaction and harmony, the process was quickly adapted. Distance education was started, all kinds

of meetings, including boards, were held via Zoom. Student and parent groups were formed and used actively. The notifications were made in environments such as telephone, mail, WhatsApp." M11

Due to the measures taken during the pandemic process, it is seen that schools have to switch to distance education partially and then completely. The opinions of school principals in this area are evaluated below in line with the sub-dimensions of "technology leadership standards" determined as NETS-A by the International Educational Technologies Society (ISTE) in the USA.

### In terms of "Leadership and Visionary" behaviors of school principals
Technology leadership and visionary by Anderson and Dexter (2005) is identified as the technology leaders in the school developing a common technological vision, creating a budget and providing resources in order to realize the common vision, creating a collaborative and organizational climate. They say that there is change and development. It can be said that this behavior overlaps with the "technology leadership standards" leadership and visionary sub-dimension. In addition, production with informatics, distance education with EBA, digital transformation, etc. opened by the Ministry of Education. It is stated that participation in in-service trainings is provided, distance training is given to teachers about the use of EBA and Zoom programs, and teachers are encouraged to in-service trainings. These listed applications can be interpreted as school principals' efforts to realize a common vision in schools against the current pandemic and to create an organizational identity. As stated by an interviewed school principal; It can be shown as leadership work by creating a school channel and creating lecture videos and presenting them to students, providing budget and resources to benefit from technology, and increasing the use of technology in education. According to Dinç (2019); School principals should achieve interdisciplinary harmony in technology. School principals should be aware of the significance of educating staff assigned to utilize technology in schools for this purpose. In order to adapt technology to these studies, school principals must take a more thorough look at learning and teaching activities and recognize the value of working together with other staff.

### In terms of "Learning and Teaching" behaviors of school principals
Turan (2002) believes that various modifications should be made to the school. The instructional aims of the school should be considered. One of the primary responsibilities of the school is to bring to light the child's natural qualities and capabilities. This is a lengthy and complicated procedure. Technology should be used efficiently in teacher assessments, instructional software packages, curriculum creation, and so on. When required and frequently, the school administrator must act as initiator and leader in these areas. According to Anderson and Dexter (2005), among the technological leadership requirements are learning-centered education and the creation of collaborative and high-skill workplaces. In this research, it is understood that as school principals stated, distance education has been switched to due to the pandemic and education and training activities are provided by using EBA and Zoom programs over technological tools. It is discovered that meetings of the teachers' board, the branch teachers' board, the branch teachers' board, and the parents' meetings are not overlooked and are held online in order to achieve consensus in the content of the EBA and Zoom programs and activities that enhance the education and training activities.

### As the "Assessment and Evaluation" behaviors of school principals
Different observation tools are used in education to measure the learning and knowledge levels of students. Technological opportunities can be used for measurement and evaluation (Anderson & Dexter, 2005). With the transition of schools to distance education, since daily assessments will be taken directly in the online course environment, the measurement and evaluation process has also been done via computers. The EBA education platform also measures how long teachers and students use the platform (EBA).

### As the "Support Management and Operations" behaviors of school principals
School principals should ensure that technology is used effectively in schools in terms of support management and operations. Thus, they can easily carry out all the activities of the school using technology (Anderson & Dexter, 2005). In the research, school principals; Sending all kinds of messages and receiving feedback is done via e-mail, telephone, WhatsApp, online surveys in the fastest way (f: 12), production with informatics opened by the Ministry of Education, distance education with EBA, digital transformation, etc. Participation in in-service trainings (f: 3), distance training given to teachers on the use of EBA and Zoom programs (f: 5), online meetings of teachers' board and branch teachers' board via Zoom (f:7), parent meetings held online via Zoom. (f:6), there are statements that students and teachers are guided about the difficulties encountered in the use of the EBA and Zoom platform (f:3). It is seen that these listed applications are studies that support educational activities and facilitate applications.

**As the "Efficiency and Professional Practice" behaviors of school principals**
The crucial impact of technology in schools and school management has been related to the decision-making process, which is one of the main processes of school management (Marshall, 1983; Turan, 2002). Organizing and leading decision-making mechanisms is one of the most important functions of the education manager. Information is one of the primary conditions for effective decision making. Thanks to computers and related technologies, any manager can obtain thousands of pages of information in a short time and can make healthier plans with this information. This will save time in management. The education manager devotes a large part of his time to bureaucratic work and correspondence. In the case of effective use of technology in these works, the education manager will be able to devote more time to the educational issues, which are his main duty (Turan, 2002:272-273). "Technology leadership standards" and "Efficiency and Professional Practice" sub-dimension are defined by Anderson and Dexter (2005) as school principals can use technology to increase the efficiency of teachers, students and other school staff and strengthen their communication.

In the research, school principals; Along with the pandemic, the school's informatics tools were developed and distance education was started (f: 12), WhatsApp groups were created and all kinds of messages were sent and feedback was done via e-mail, telephone and online surveys (f: 12), in-service trainings opened by the Ministry of National Education were encouraged the participation (f:3), as well as distance education about the use of EBA and Zoom programs (f:5), teachers' board and branch teachers' board meetings are held online via Zoom (f:7), parent meetings are held online via Zoom (f: 5). (f:6) opinions about lecture videos are formed by creating a school channel (f:1). These school principals' perspectives demonstrate that they made judgments in order to make education procedures more effective during the turmoil of the pandemic phase, and they worked hard to put them into action.

**As the behavior of school principals on "Ethical, Social and Legal Issues"**
It is stated by Anderson and Dexter (2005) that school principals should ensure that everyone benefits from technological opportunities equally and that they should also consider and solve various problems arising from technology. In the research by school principals; It is stated that by creating communication groups for parents and students at the grade level, all kinds of messages and feedback are tried to be provided (f:12). It is also said that teachers and students are trained on the use of EBA and Zoom platform (f:5), and students and teachers are guided about the difficulties encountered in these subjects (f:3). This demonstrates that every effort was made to contact every individual as much as possible, that several communication means were employed, and that counseling was provided regarding the increased challenges.
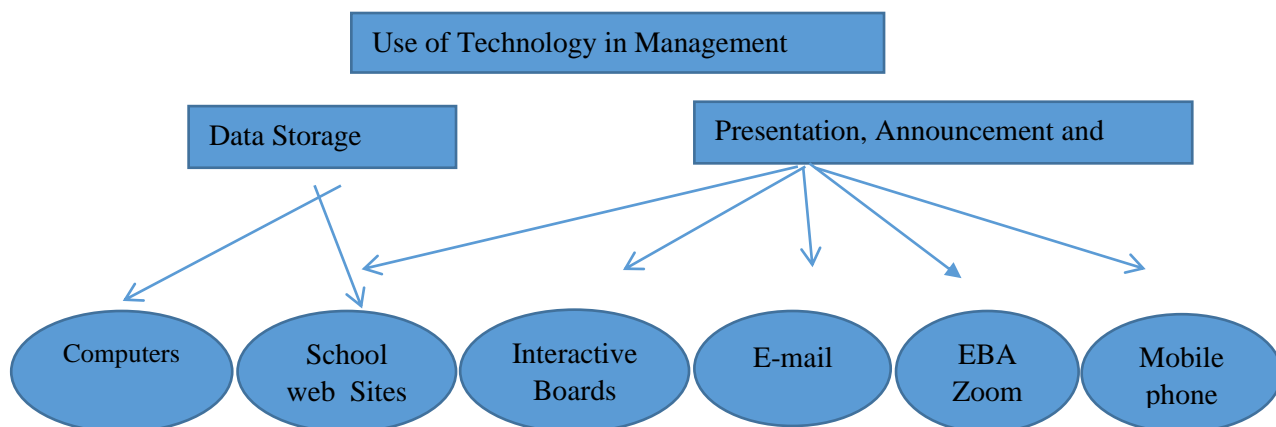


**Figure 1:** Technological tools used in management during the pandemic process

Technological tools used by school administrations during the pandemic process are shown in Figure 1.

**Information technologies in pre-pandemic education and training applications**

In this study, the studies of the participants working as teachers on information technologies related to education and training applications before the pandemic process are collected in Table 4 below and their frequency of repetition is given.

**Table 4**: Uses of information technologies in pre-pandemic education applications

| Teacher Views | Participant Codes | F |
|---|---|---|
| Teachers and students were trained on the use of interactive whiteboards. | T1-T4-T5-T6-T9-T10-T11-T12 | 8 |
| Information was given about lesson contents and EBA to be used on interactive whiteboards. | T1-T4-T8-T9-T11 | 5 |
| Information about EBA lesson contents was given and occasional application was made. | T1-T2-T3-T4-T5-T10-T11-T12 | 8 |
| Information groups were created on Whatsapp. | T1-T2-T3-T9-T11 | 5 |
| The lessons were taught on the interactive whiteboard. | T2-T3-T6-T7 | 4 |
| Information and implementation studies regarding the Fatih Project were carried out. | T4 | 1 |
| Information was given about the lesson sites Zoom and Skype. | T5 | 1 |
| We benefited from sites such as EBA, Vitamin, Morpakampüs, Okulistik. | T6 | 1 |
| Sample questions and tests prepared for the MEB Support and Training Courses and available on the internet were used. | T6 | 1 |
| Branch teachers' meetings, branch teachers' meetings, commissions were held over Mebbis for a period, and then the application were abolished. | T7 | 1 |
| In-service training requests were received online. | T8-T12 | 2 |
| The academic support platform was introduced to teachers and students. | T8-T12 | 2 |
| Students were provided with the use of computers in libraries. | T12 | 1 |

In Table 4, the views of teachers on the use of information technologies in the education and training applications of pre-pandemic schools are mostly; Teachers and students are given training on the use of interactive whiteboards, information is given about EBA course contents, and occasional practice is made (f:8). Then; It is stated that information is given about the course contents and EBA to be used on interactive whiteboards, information groups are created via Whatsapp (f:5), and lessons are taught on interactive boards (f:4). Yavuz and Coşkun (2008), in their study to reveal the attitudes and ideas of classroom teacher students towards the use of technological equipment in teaching, stated that the use of technological equipment in teaching positively affects their attitudes towards school. Yet, in a study conducted in Turkey, teachers listed insufficient budget, lack of equipment, lack of in-service training and insufficient technical administrative support as reasons preventing the use of computers in education (Kuşkaya-Mumcu & Koçak-Usluel, 2004).

Teachers expressed the following statements regarding the subject:

"Students were informed about the course contents of the interactive whiteboards. EBA course contents were shown to the students. Whatsapp groups have been created." T1

"Lessons were taught on the interactive whiteboard, and students were watched by making use of the course contents in EBA. Information sharing groups were created through the Whatsapp application." T2, T3

"Seminar studies were held for the smart board application. Information about EBA contents was given. Information was given about lecture sites such as zoom and skype outside of EBA." T5

"Before the epidemic started, we were doing normal education in our schools. We provided face-to-face education in our schools, and we were teaching in the same environment with our students in our classes without social distance and masks. We actively used our smart boards while teaching in the classrooms. We actively processed the smart board contents of various publishers together with our students. We especially used these websites; EBA, Vitamin, Morpakampus, Okulistik etc.. In addition, we solved the sample questions and tests on the internet address https://odsgm.meb.gov.tr/kurslar/ prepared for the Support and Training Courses by the General Directorate of Measurement, Evaluation and Examination Services of our Ministry of National Education with our students in our classes." T6

"Before the pandemic process, lessons were taught with smart boards and tablets. For a period of time, group teachers' meetings, branch teachers' meetings, commissions were made over Mebbis in education and training affairs, then these applications were abolished. T7

"In-service training requests were received online. An informative presentation was made on the use of the EBA platform. The academic support platform was introduced to teachers and students." T8

"Information about smart boards and EBA was given. Students were provided with the use of computers in libraries. In-service training requests were received online. The academic support platform was introduced." T12

**Information technologies in education applications during the pandemic process**
In this study, the studies of the participants working as teachers on information technologies regarding education and training applications during the pandemic process are collected in Table 5 below and their frequency of repetition is given.

**Table 5**: Usage areas of information technologies in education applications during the pandemic process

| Teacher Views | Participant Codes | f |
|---|---|---|
| Lessons were realized via EBA and Zoom. | T1-T2-T3-T4-T5-T6-T7-T8-T9-T10-T11-T12 | 12 |
| Parent meetings were held online via Zoom. | T1-T2-T3-T4-T9-T11 | 6 |
| Studies were sent to students via Whatsapp, Zoom and EBA, where students' questions were answered. | T1-T3-T6-T7-T9-T11 | 6 |
| Information was given about EBA contents, academic support, homework, test revision studies. | T5-T8-T12 | 3 |
| Studies were carried out in the form of content preparation and uploading for EBA. | T2-T5-T6-T10 | 4 |
| Educational activities began to be carried out in the form of distance education. | T1-T2-T3-T4-T5-T6-T7-T8-T9-T10-T11-T12 | 12 |
| Meetings with the groups and exchange of ideas between the groups were made through the Zoom video conference system and Whatsapp application. | T1-T2-T3-T6-T7-T9-T11 | 7 |
| Groups were created for question-solution and information sharing by making effective use of telegram in terms of information sharing. | T2-T9 | 2 |
| Interactive internet content is used more than in face-to-face education (intelligence games, achievement comprehension tests, practice exams, solved questions). | T6 | 1 |
| By creating a school channel, lesson videos were shot and uploaded to the channel's page.. | T8 | 1 |
| Efforts were made to strengthen the internet infrastructure of the school. Works on technology have been maximized. | T12 | 1 |
| EBA support points were created. | T12 | 1 |

Teachers expressed the following statements regarding the subject:
"The lectures were made over the EBA and Zoom system. Parent meetings were held via Zoom. Studies were sent to students via Whatsapp and EBA platform. Educational activities began to be carried out in the form of distance education. Studies were sent to students via Whatsapp, Zoom and EBA, and students' questions were answered. Meetings with the groups and exchange of ideas between the groups were made through the Zoom video conference system and Whatsapp application." T1

"Courses were taught through EBA, course contents were used. Studies were carried out in the form of content preparation and uploading for EBA. Groups were created for question-solution and information sharing by making effective use of telegram in terms of information sharing. Parent meetings were held online. Distance education started. Work was done in the form of content preparation and uploading for EBA. Group meetings were held online and ideas were exchanged." T2

"With the onset of the epidemic, face-to-face education was given a mandatory break. Apart from the education we always do, we started distance education on the internet in an environment that we do not know but are familiar with. Distance education was a difficult process for both our students and us teachers. At first, we had a very difficult time. We learned how to do distance education. We benefited from both our textbooks and the educational content on the internet. I can't say that the lesson, which is held in front of the screen and sitting, is very productive. We used various intelligence games to teach the lessons in a more fun way without boring the students. We used interactive internet contents more than in face-to-face education. In addition to this, we sent the achievement comprehension tests, essays, sample questions prepared by the Ministry of National Education, skill-based questions from the class groups to our students. We sent various lectures and videos from EBA for students to watch, and exercises to solve. Especially LGS We made an evaluation by solving a remote trial with our 8th graders

who will enter the . We answered the questions that our students did not understand both via Zoom and Whatsapp. In addition, we have made all kinds of communication with our students, parents and colleagues via Zoom, WhatsApp, phone and e-mail. We held group meetings with the Zoom video conference system and communicated through the Whatsapp application." T6

"Lessons were given over EBA, distance education was started. Communication was established by WhatsApp, phone, mail, and sms. Parent meetings and group meetings were held via Zoom, and views were exchanged. Studies were sent to students via Whatsapp and EBA platform. Studies were sent to students via EBA and Whatsapp groups. It effectively benefited from Telegram in sharing information during the pandemic period." T9

Teachers' application of information technology prior to the pandemic may have risen as a result of the pandemic's influence, with the shift of schools to remote education in this process. The teacher's technical expertise and experience are the most critical factors in determining whether and how computers will be employed in educational settings. The quantity of computers in the school and classroom, the teacher's level of interest in his own professional development, the philosophy of education and other elements will all be beneficial (Becker, 2001).
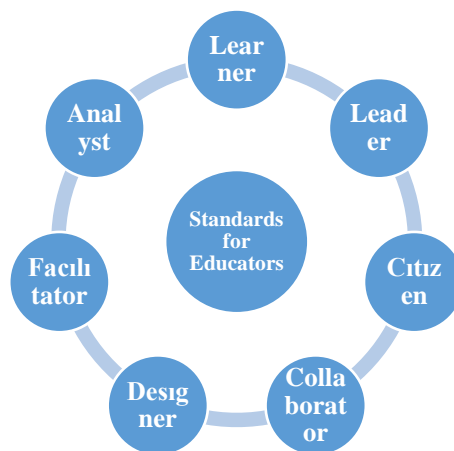


**Figure 2**: ISTE Standards for Educators, Source: ISTE

In Figure 2, teachers' opinions were evaluated in line with the "Standards for Educators" determined by the International Educational Technologies Society (ISTE).

**Behavior of teachers as "Learner"**
Teachers should conduct investigations and research using technology to help pupils learn more effectively. They are continually improving their skills by reviewing example applications. They should include technologically induced educational advancements as well as their thoughts in their vocational training. They should be aware of both national and worldwide professional advancements. They should be able to learn to create and use digital content (ISTE). In this research, by the teachers; it is monitored that some applications that they have not done before have started to be made, so they have to learn and apply new applications in teaching methods and techniques. These; Conducting parent meetings online via Zoom (f:6), sending students studies via Whatsapp, Zoom and EBA, and answering students' questions (f:6) Giving information about EBA content, academic support, homework, test repeat studies (f:3 ), education activities are carried out in the form of distance education (12), meetings with groups and exchange of ideas between groups are made via Zoom video conference system and Whatsapp application (f:7), question-solution and information sharing by using telegram (f:2) is in the form of creating a school channel and shooting course videos (f:1). Flanagan and Jacobson (2003) drew attention to some issues regarding the effective use of educational technologies in their studies. Students should be encouraged to use technology goods that are appropriate for their learning levels, and their readiness levels should be assessed. With the collaboration of all educators, a shared vision for the use of technology in education should be developed. Teachers should be educated on how to use technology in the classroom. It should be assured that all instructors and pupils in the school have equitable access to technology opportunities (Cikrik, 2020).

**Behavior of teachers as "Leader"**
Teachers, as the leaders of their classrooms, should arrange learning environments and coach students based on their skills. They should look for possibilities and assist pupils in areas where they will succeed. They should do research that reflects their learning surroundings and varied instructional techniques by utilizing technology advancements. They should ensure that all students have access to needed educational technologies and digital content (ISTE). In this research, by the teachers; It is understood that they resorted to alternative methods and managed the process for the problems arising from the pandemic. An example of this is the transfer of the communication that should be established with the parents to the digital environment to discuss the situation of the students. Besides, it is stated that studies are sent via Whatsapp, Zoom and EBA in order to measure the learning status of students and students' questions are answered (f:6). Because of the features of the time, interactive online materials are employed more than face-to-face education, and a school channel is formed as an independent study.

**Behavior of teachers as "Citizen"**
Teachers should encourage students to participate responsibly in the digital world and to contribute positively in these settings. Learners create practice environments for students to demonstrate social responsibility in digital settings and an empathetic attitude that will contribute to global and local events. They should teach students digital literacy and media fluency so that they can properly examine internet materials and demonstrate a critical attitude, and they should foster a learning culture. They also provide information on the safe, legal and ethical applications of online environments, and the protection of intellectual property and property. They set an example for the protection of personal data and especially for the protection of student private data (ISTE). According to the instructors' perspectives in this study, it is clear that the essential duty is demonstrated by providing information on EBA academic support for students (f:3), and they follow the studies conducted to develop the internet infrastructure and build EBA support points. These studies are being followed up on in order to offer students with access to instructional activities that use online material.

**Behavior of teachers as "Collaborators"**
Teachers devote time to other teachers and education stakeholders, as well as students, to develop applications, share ideas and solve problems together. They work collaboratively with their colleagues to create new learning applications that will improve technology. They learn together by collaborating with colleagues and students. Experts in local and global virtual environments, including students, colleagues and parents, research and explain according to the values of different cultures in order to develop students' authentic real-world learning experiences (ISTE). By having parent meetings online through Zoom (f:6), sending students' studies via Whatsapp, Zoom, and EBA and answering their questions (f:6), and telling them about EBA topics, academic help, homework, and exam repeat studies (f:3), worked in collaboration with students and parents. Additionally, it is believed that discussions and idea exchanges between groups are conducted using the Zoom video conferencing technology.

**Behavior of teachers as "Designers"**
Teachers create one-of-a-kind, learner-centered activities and learning environments that take into account individual characteristics. They design and implement learning experiences that stimulate individual learning and match the requirements of learners, and they employ technology to personalize them. They organize original learning activities that support learning with the content standards of their own fields. They actively use these contents with digital tools and resources. They realized research and applications related to instructional design to create innovative digital learning environments (ISTE). In the study of Uçar Sarımanlıoğlu (2019:32); it has been stated that teachers are keen on the development of technology use in lessons, and it is understood that they are more inclined to use e-contents ready-made, therefore it would be beneficial to provide teachers with training on producing e-content in their own fields. In this research, teachers' opinions; Content preparation and uploading studies for EBA (f:4), intelligence games using interactive internet content, achievement comprehension tests, practice exams, creating solved questions (f:1), creating a school channel (f:1) and creating EBA support points (f: 1). As it is understood from these views, it can be said that there is a tendency to different applications for distance education and new learning experiences are designed according to the needs.

**Behavior of teachers as "Facilitators"**
Teachers use technology to support learning activities and help students succeed. Teachers assist students in developing a culture in which they will have learning objectives and outcomes both independently and in groups. They have authority over students' usage of technology and learning applications in online settings, as well as technology-oriented subjects. They create learning opportunities that will encourage students who will bring innovation and solutions to problems (ISTE). From the ideas expressed by the teachers in this research, it can be said that alternative and usable methods are sought due to the depression created by the pandemic in education. It

is possible to consider these to be facilitating ways for carrying out educational tasks. The transition to distance education because face-to-face education could not be provided, online communication with students and parents, and lessons delivered via Zoom, EBA, TV, and school channels are all studies that facilitate education and training studies in the midst of an emerging pandemic matter.

**Behavior of teachers as "Analyst"**
Teachers comprehend and apply data to arrange students' learning and assist them in achieving their learning objectives. They give various options for pupils to show their technological expertise. They perform process and result evaluations to fulfill the requirements of students, offer timely feedback, and tell them about their teaching level. In doing so, they are assisted by technology. They use assessment data to see and guide progress. They share this data with students, parents and education stakeholders (ISTE). In this research, teachers' opinions on this subject; Answering questions (f:6) by sending studies to students via Whatsapp, Zoom and EBA, informing students about EBA contents, academic support, homework, test-repeat studies (f:3), making question-solution studies by using telegram in terms of information sharing (f :2), intelligence games, acquisition comprehension tests, practice exams, and questions with solutions. During the pandemic era, pupils' learning levels are attempted to be assessed in both online and offline internet platforms.

The e-Learning Industry (2016) lists smart technology applications in educational environments as follows: Interactive boards, cameras and videos, tablets and e-books, student ID cards with sensors, 3D printers, smart heating, cooling and ventilation systems, temperature sensors, monitoring systems and network based door locks (Altınpulluk, 2018).
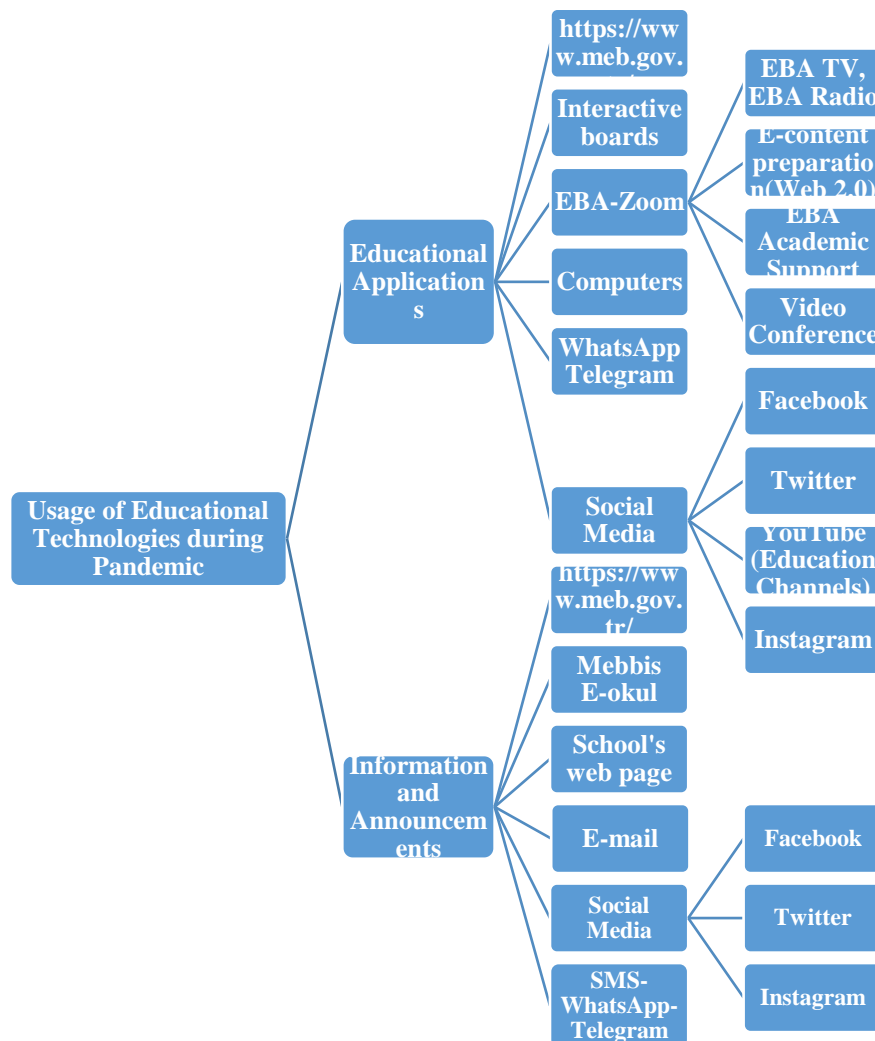


**Figure 3**: Technological tools used in education applications during the pandemic process

According to this research, the technological tools used in education and training applications during the pandemic process are shown in Figure 3. These are: Interactive boards, meb.web page, computers, WhatsApp, Telegram, EBA (EBA TV, EBA Radio, e-content preparation (Web 2.0), EBA Academic Support), Zoom video conference, social media (Facebook, Twitter, YouTube) -educational channels, Instagram) environments. Technological tools used for information and announcements during the pandemic process are as follows: Meb.web page, Mebbis, e-school, school web page, e-mail-mail, telephone (WhatsApp, Telegram, message), social media (Facebook, Twitter, Instagram) platforms.

## RESULTS
In this part, the results obtained from the opinions of the participants in line with the four sub-questions of the study are presented.

a) It is monitored that technological tools such as computers, interactive whiteboards, school web pages, e-mails and telephones are generally used in the management works of pre-pandemic schools, and they are mostly used to store data, make presentations, make announcements and inform, communicate. Although interactive whiteboards created for educational activities are not used in the field of administration, it is understood that there is not much information work on their effective use.

b) By school principals when schools have to switch to distance education during the pandemic process; Production with informatics, distance education with EBA, digital transformation etc. opened by the Ministry of National Education. It is seen that they participate in in-service trainings, teachers are provided with distance training on the use of EBA and Zoom programs, teachers are encouraged to in-service training, strengthen communication with stakeholders against the pandemic problem, and provide guidance against the difficulties encountered in education and training processes. In addition, it is understood that teachers' board, branch teachers' board, branch teachers' board and parent meetings are held online and school channels are created. In line with these applications, it is revealed that they strive to achieve a common mission. Technological tools used in management during the pandemic process; computers, school websites, interactive whiteboards, e-mails, EBA, Zoom and phones.

c) Educational applications in pre-pandemic schools; It is seen that training teachers and students about the use of interactive whiteboards, giving information about EBA course contents, creating information groups over the phone and explaining the lessons over the interactive board.

d) Pre-pandemic technological tools are used for informational purposes and as the use of interactive whiteboards; After the pandemic, it is seen that education and training applications and all kinds of information activities are carried out entirely through technological tools. In this process, by the teachers; it is seen that some applications that they have not done before have started to be made, so they have to learn and apply new applications in teaching methods and techniques. These are respectively; Making online parent meetings via Zoom, sending students studies via Whatsapp, Zoom and EBA and answering students' questions, informing about EBA contents, academic support, homework, test repeat studies, meetings with groups and exchange of ideas between the groups via Zoom video conference system and Whatsapp application, question-solution and information sharing by using telegram, and shooting lesson videos by creating a school channel. Technological tools used in education and training applications during the pandemic process: Computers, interactive boards, web pages, e-mails, phones, WhatsApp, Telegram, EBA (EBA TV, EBA Radio, e-content, web 2.0 tools, EBA Academic Support), Zoom video conference, social media (Facebook, Twitter, YouTube-educational channels, Instagram) platforms.

## SUGGESTIONS
In this part, suggestions for the use of technology in management works and education applications in schools are given based on the results of the research.

a) The use of educational technologies, which gained importance with the pandemic process, should be increased in management works in schools, and school principals should be trained in this regard so that they can be prepared for similar situations.

b) In order not to lag behind the digitalized world in educational environments, developments in this field should be followed; Applications that facilitate management work should be moved to educational environments. It should be ensured that educational environments, not only for distance education, reach the most ideal criteria for students. Student ID cards with digital sensors, automatic heating systems that provide heating, cooling and ventilation of educational environments, student service monitoring systems, security cameras and in-/out-of-

school hazard warning systems, automatic door locks, instant student/parent/teacher information systems, multi-dimensional printers etc. applications should be upgraded according to the situation.

c) For teacher education, training, and assessment; e-content, web 2.0 technologies, and so on. Practical training in online measurement and evaluation using digital technologies should be provided, and e-platforms should be developed to communicate and distribute the findings.

d) During the epidemic, teachers' usage of e-content, web 2.0 technologies, and so on. Preparation and usage research should be carried out.

e) Research on the application of online assessment and evaluation methodologies and procedures during the pandemic phase should be done.

**REFERENCE**

Adada, N., Shatila, A. ve Mneymineh, N. M. (2017). Technology leadership: bridging the gap between problems and solutions in lebanese schools. Ronald A. Styron, Jennifer L. Styron. (Ed.). Comprehensive Problem-Solving and Skill Development for Next-Generation Leaders. USA: Igi Global

Akcil, U. Altinay, Z ve Altinay, F. (2016). Assessing the Effects of Managers in the Digital Age on the Management Process of Digital Citizenship Roles. Anthropologist, 23(1,2): 209-217

Akpinar, Y. (2003). The effect of higher education on teachers' use of new information technologies: The example of Istanbul schools. The Turkish Online Journal of Educational Technology, 2 (2) 11.

Alkan, C. (1996) Educational Technology, Memoir Publishing.

Altinpulluk, H. (2018). The use of internet of things technology in educational environments. AUAd, 4(1), 94-111.

Anadolu Agency. (2020). Minister of National Education Selçuk: Distance education will continue until May 31. Retrieved on 21 June 2021 from the website https://www.aa.com.tr/tr/egitim/milli-egitim-bakani-selcuk-uzaktan-egitime-31-mayisa-kadar-devam-edecek/1822357.

Başaran, M., Doğan, E., Karaoğlu, E., Şahin, E., (2020), A study on the effectiveness of distance education, which is the result of the Coronavirus (Covid-19) Pandemic process, Academia Educational Research Journal, 5(2), 368-397

Becker, H. J. (2001). How are teachers using computers in instruction. Paper presented at the Annual Meeting of the American Educational Research Association, Seattle.

Bilgin, N. (2006). Content analysis in social sciences: Techniques and case studies. Political Bookstore: Ankara

Bozkurt, A., (2020). Coronavirus (Covid-19) pandemic process and evaluations on education in the post-pandemic world: new normal and new education paradigm, Journal of Open Education Applications and Research, 112-142.

Bulbul, T., Cuhadar, C. (2012). Analysis of the relationship between school administrators' perceptions of technology leadership self-efficacy and their acceptance of ICT. Mehmet Akif Ersoy University Faculty of Education Journal, 23: 474-499.

Can,. E., (2020), Coronavirus (Covid19) pandemic and its pedagogical reflections: Open and distance education applications in Turkey, Journal of Open Education Applications and Research, 11-53

Can, T. (2003). Technology leadership competencies of Bolu secondary school administrators. The Turkish Online Journal of Educational Technology, 2 (3), 94-107.

Collins, K. M. T., Onwuegbuzie, A. J., & Jiao, Q. G. (2006). Prevalence of mixed-methods sampling designs in social science research. Evaluation & Research in Education, 19 (2), 83-101.

Cradler, J. (2000). Implementing technology in education: Recent findings from research and evaluation studies. Far West Laboratory.

Cakir, R. (2013). Technology Integration in Schools, Technology Leadership and Technology Planning. Kürşat Çağıltay and Y. Göktaş (Ed.), Fundamentals of Instructional Technologies: Theories, Researches, Trends (1st ed., pp. 397-412). Ankara: Pegem Academy.

Cikrik, S. (2020). Examining Technology Leadership Competencies of School Principals by Teachers. Non-Thesis Master's Project, Pamukkale University Institute of Educational Sciences, Denizli.

Dikmen, A., U., Kına, H., M., Özkan, S., İlhan, M., N., (2020), Covid-19 epidemiology: what have we learned from the pandemic? , Journal of Biotechnology and Strategic Health Research, 29-36.

Dinc, H. (2019). Technology leadership competencies of school principals. Unpublished master's thesis. Duzce University Institute of Social Sciences. Duzce.

Durnali, M. (2019). Technological leadership behavior level exhibited by school principals according to the opinions of secondary school teachers. Journal of Theoretical Educational Science [Journal of Theoretical Educational Science], 12(2), 400-430.

EBA. https://www.eba.gov.tr

eLearning Industry (2016). The internet of things smart school infographic. http://elearninginfographics.com/the-internet-of-things-smart-school-infographic/ (Erişim Tarihi: 09.08.2021).

Ersoy, A. F. (2019). phenomenology. A. Saban & A. Ersoy (Ed.), Qualitative research designs in education (3rd ed., pp. 81-138). Ankara: Memoir Publishing.

Giannini, S. & Lewis, G.S.(2020). *Three ways to plan for equity during the coronavirus school closures.* https://gemreportunesco.wordpress.com/2020/03/25/three-ways-to-plan-for-equity-during-the-coronavirus-school-closures/web adresinden 28 Mart 2020 tarihinde edinilmiştir.

Marshall, D. G. (1983). -The School Administrator and the Microcomputer. Education Canadai 22(2), 4-11.

MEB. (2020). https://www.meb.gov.tr/bakan-selcuk-23-martta-baslenen-uzaktan-egitime-iliskin-detaylari-anlatti/haber/20554/tr

Hacettepe University, (2021). COVID-19 Pandemic Report. Hacettepe Internal Diseases Association, Ankara.

Huong, V. T. M. (2020). "Factors Affecting Instructional Leadership in Secondary Schools to Meet Vietnam's General Education", Innovation International Education Studies; 13(2), pp.48-60.

ISTE (2009). Iste Standards for Administrators. http://www.iste.org/standards/foradministrators

ISTE. ISTE Standards for Educators. https://info.iste.org/educator-standards-poster?_ga=.11849332. 1584910039.1638057680-866963711.1638057680 adresinden 28.11.2021 tarihinde ulaşılmıştır.

Kearsley, G. (1994). Computers for Educational Administrators: Leadership in the Information Age. Norwood, NJ: Ablex Publishing Corporation.

Knuth, B., Hopey, C., & Rocap, K. (1996). Guiding Questions for Technology Planning: Version 1.0 [Online]. Available: http://www.ncrtec.org/capacity/ guidewww/gqhome.htm

Kuşkaya-Mumcu, F. & Koçak-Usluel, Y. (2004). Vocational and technical school teachers' computer use and obstacles. Hacettepe University Faculty of Education Journal, 26, 91–99.

Lee, V. Chng, L. Coombs, SJ. (2004). Applying self-organised learning to develop critical thinkers for learning organisations. A conversational action research Project, 12:363-386.

Maddin, E.A. (2002). Factors that influence technology integration in elementary instruction. Unpublished Doctoral Dissertation, University of Cincinnati, USA.

Miles, M. B. and Huberman, A.M. (1994). An expended source book qualitative data analysis. London: Sage Publication.

Odabaş, H. Odabaş, Z. Y., Binici, K. (2019). "The Effects of Digital Information Resources and Environments on University Students' Reading Behaviors", Milli Eğitim, 49 (227), pp.89-116.

Onwuegbuzie, A. J., & Leech, N.L. (2007). A Call for qualitative power analyses. Quality & Quantity, 41, 105-121.

Özer, M., (2020), policy steps taken by the ministry of national education during the covid19 epidemic in Turkey, Kastamonu Education Journal, 2883), 1124-1129

Polat, S. and Özcan, A. (2014). Views of Classroom Teachers on the Use of Smart Boards. Kastamonu Education Journal, Volume 22, Issue 2, 439 – 455.

Ribble, M. ve Bailey, G. (2007). Digital Citizenships in Schools. Washington: ISTE.

Saban, A. (2006). School Technology Planning: An Applied Model Proposal for Primary Schools and Its Results in Terms of Teacher Training System. Doctoral Thesis. Selcuk University, Institute of Social Sciences. Konya.

Saygı, H. (2021). Problems Faced by Classroom Teachers in the Covid-19 Pandemic Distance Education Process. Journal of Open Education Applications and Research-AUAd. Volume 7, Issue 2, 109-129.

Silins, H. Zarins, S. (2002). What characteristics and processes define a school as a learning organization? Is this a useful concept to apply to schools. International Education Journal, 3: 24-32.

Telli Yamamato, G., Altun, D., (2020), Coronavirus and the rise of online education to non-prevention, Journal of University Studies, vol: 3, issue: 1, pp: 25-34

TEDMEM (2021). COVID-19 and the Situation of Schools in the World, https://tedmem.org/covid-19/covid-19-ve-dunyada-okullarin-durumu

Turan, S. (2002). The Role of the Education Manager in the Effective Use of Technology in School Management. Educational Management in Theory and Practice. Number: 30, 55, 271-28.

Uçar Sarımanoğlu, N. (2019). Difficulties Encountered by Teachers in Using Educational Technology in Classrooms. MEB General Directorate of Innovation and Educational Technologies. http://yegitek.meb.gov.tr/meb_iys_dosyalar/2020_03/26131950_ogretmenlerinsiniflardaegitimteknolojisiokulimindakarsilastiklariguclukler.pdf Accessed on 08/11/2021.

Unal Bozcan, E. (2010). Journal of Educational Technology Research. Sakarya University ISSN: 1309-5099, vol:1, issue:4, p.p: 1-13

Yavuz, S. and Coşkun, E.A. (2008). Attitudes and Thoughts of Primary School Teachers on the Use of Technology in Education. Hacettepe University Faculty of Education Journal, Vol 34, No 34, 276 – 286.

Yikici B, Altinay Z, Dagli G, Altinay F. (2016). The evaluation of strategies used to Improve teaching and learning in education society. The Antropologist, 23: 462-479.

Yıldırım, A. & Şimşek, H. (2013). Qualitative research methods in the social sciences. (9th Edition). Ankara: Seçkin Publishing

Yılmaz, E., Mutlu, H., Güner, B., Doğanay, G., Yılmaz, D., (2020), The Quality of Distance Education in the Pandemic Period According to Parent Perception, Palet Publications, Konya.

WHO.(2020). *Coronavirus disease (COVID-19) outbreak situation*. https://www.who.int/emergencies/diseases/novel-coronavirus-2019,

https://voxeu.org/article/impact-covid-19-education, Schools, Skills, and Learning: The Impact of COVID-19 on Education, Simon BURGESS, Hans Henrik SIEVERTSEN, 19 April 2020.

https://www.worldsofeducation.org/en/woe_homepage/woe_detail/16727/%E2%80%‑9Cwhat-the-covid19-pandemic-will-change-in-education-depends-on-the-thoughtfulness-of-education responses-today%E2%80%9D-by-fernando-mreimers, What The Covid-19 Pandemic Will Change in Education Depends On The Thoughtfulness Of Education Responses Today, Fernando M. REIMERS, 19 April 2020

# Developing a Series of Scales for Generations' Values in the Age of New Media: Validity and Reliability Study of Uskudar XYZ Generation Differences Scale

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**ABSTRACT**
In this research, it is aimed to develop a series of scales to determine the changing values and behaviors of different generations in society today, where new media environments are diversifying day by day. In the study, which took into account the generation classification made with the focus of technological tools, generation X was considered as "Radio Generation", Y generation as "Television Generation", generation Z as "Social Media Generation". Thus, the study group consisted of 1083 people classified as generation X (over 45), Y (30 – 45 years old), and Z (15 – 30 years old). 12 independent scales were obtained as a result of validity and reliability studies. These scales are formed in a dimensional structure within themselves, and each scale and subscales are named with appropriate names. The names of the scales revealed in the study are as follows: (1) Organizational Commitment and Authority Scale, (2) Self-Assessment Scale, (3) Friendship Bond Scale, (4) Popular Culture Scale, (5) Impulse Control Scale, (6) Technology Use Scale, (7) Social Norms Acceptance Scale, (8) Multiple Attention Scale, (9) Work Loving Scale, (10) Internal Control Scale, (11) Impatience Scale, (12) Family Values Scale. All scales are valid and reliable. It is hoped that the resulting scales will be used independently by the researchers individually or together as a battery.
**Keywords:** New Media, Generation, XYZ, Scale Development, Validity

**INTRODUCTION**
As the development of communication technologies progressed rapidly, the rapid transformation of communication habits and ways of doing business was witnessed from radio technology to new media technologies, including multisensory organs and interaction. The fact that a person who grew up as a radio generation has reached the social media generation today has led to the need to revisit the so-called generational differences on a technology-based basis.

When the concept of generation is examined, it is included in the field research area on various subjects with definition, classification, characteristics, differences, and generational approach. It is emphasized that the researches focus on issues such as education, business life, use of technology, values, and behaviors, and even perspectives on life and that generations differ from each other by exhibiting distinct characteristics. (Adıgüzel & et al., 2014; Deniz & Tutgun-Ünal, 2019; Ekinci & et al., 2021; Ekşili & Antalyalı, 2017; Özdemir, 2021; Morsümbül, 2014; Tarhan, 2020; Tolbize, 2008; Toruntay, 2011; Tutgun-Ünal, 2021; Zemke & et al., 2013). Focus group studies on the need to address intergenerational communication differences with a focus on technology are also found (Tarhan & Tutgun-Ünal, 2021; Yıldırım Becerikli, 2013).

In the 2000s, the rethinking of generations in the new media age was influenced by technological development and the consequent spread of new media technologies around the globe, replacing communication habits with digital communication. Facebook has left its name to "Meta" as the use of social media, the most well-known popular of new media technologies spread rapidly in all countries around the world. As we transition from the age of social media to the Metaverse age, generations will also face new communication and behavioral habits in the Metaverse universe and new differences will have to be addressed. In this respect, it can be said that the concept of generation is a dynamic concept, not a static one. (Alwin & McCammon, 2007).

When the generation definitions are examined, it is seen that it is classified as Silent Generation (1927-1945), Baby Boomer (1946-1964), Generation X (1965-1979), Generation Y (1980-1999), and Generation Z (2000 and beyond), according to the birth date ranges of generations worldwide. (Berkup, 2014; Ekşili & Antalyalı, 2017; Tutgun-Ünal, 2013; Zemke, 2013). In another classification taking into account the development of technological

tools, generation X is called radio generation (45 years and older), Y generation is called television generation (30-45 years) and generation Z (15-30 years) is called social media generation and those under 15 years of age are called Alpha generation. (Döğer, 2020; Özdemir, 2021; Tarhan, 2020). In this study, XYZ generations were classified and classification according to technological tools was taken into account.

Since the proliferation of computer technologies and increasingly mobile technologies took place during the Y-generation period, millennials took part in research as a generation where differences were felt most prominently. (Akdemir & et al., 2013; Asmafiliz & Şalvarcı Türeli, 2018; Bayramoğlu & Şahin, 2017; Berkup, 2014; Çetin Aydın & Başol, 2014; Engizek & Şekerkaya, 2016; Ekşili & Antalyalı, 2017; Kelgökmen İlic & Yalçın, 2017; Kuyucu, 2017; Tutgun-Ünal, 2013; 2021; Türk, 2013). Nowadays, it is emphasized that the communication habits and values, and behaviors of the generation Z, who met technological devices earlier and grew up with mistakes, have become completely different. (Latif & Serbest, 2014; Özdemir, 2021; Süer & et al., 2017; Tarhan, 2020; Taş & et al., 2017).

Values are defined as a guidance that guides behaviors. Values are common concepts accepted by society as a common. Today, many kinds of research are carried out on the values system of young individuals focusing on academic success. (Deniz & Tutgun-Ünal, 2019; Morsümbül, 2014; Tarhan, 2015; Tutgun-Ünal, 2021). In these researches, business life, perspectives on life, tolerance to differences, marriage and family life perspectives are examined and it is discussed whether values are fully formed in young people. (Börü & Yurtkoru, 2016; Tarhan, 2020; Tutgun-Ünal & Deniz, 2020). However, studies have been found that emphasize that the values system has evolved into an online values system with the effects of social media. (Tutgun-Ünal & et al., 2021). Therefore, building values on solid foundations is seen as extremely important for psychological well-being today. (Seligman, 2019).

Tarhan (2015) refers to two types of values as vehicle values and purpose values, and it is seen as important to create measuring instruments to cover this context. Thus, "Objective values" indicate more abstract purposes in a person's life. "Tool values" are a way for the person to achieve their goals in life. Although the objective values can be classified in themselves, they have virtues such as love, trust, being compassionate, enjoying doing goodness, having social boundaries, being honest and fair, being tolerant and peaceful, sharing. Tool values are values that eliminate negative emotions such as being organized, congratulating success, saying nice words, showing relaxing and flexible qualities that are appropriate by others, trying to do his job, being canny, being soft and flexible in the face of situations, being polite to people and making appropriate comments that are not in the wrong. (Tarhan, 2015). On the other hand, considering that values are universally and culturally divided, it is clear that the values of this means and purpose will vary from culture to culture and even from nation to world. From this point on, it is seen as important to measure generational differences to include these values.

However, psychometric scales are needed to measure the existing situation in determining generational differences not only in terms of technology use but also in determining values and related behaviors. The fact that these scales are multidimensional and contain many issues is important for the multifaceted handling of measurements and it is possible to achieve more complementary results together. When literature is examined, a study of three scales called social media usage scale, working life scale, acceptance scale of differences for generations is found (Deniz & Tutgun-Ünal, 2019). On the other hand, researches on applying scales focused on a single topic to generations provide data to focus on a single topic, while multiple scales are needed that provide a holistic view of generations. However, by using a combination of versatile measurements, the differences of the generations will be understood in more detail and the effects of many factors can be measured in terms of their effects on each other.

Thus, in this research, it is aimed to develop scales containing these tangible and intangible objectives by addressing the values in terms of objective values and tool values. For this purpose, the development of valid and reliable scales that can be used in psychometric processes that can measure values within the scope of topics such as "Belonging, trust, self-confidence, individualism, convenience, friendship bond, popular culture, impulse control, acceptance of social norms, multiple attention, love to work, internal control, impatience, haste, family values" together with the use of technology constitutes the problem of this research.

**METHOD**
*Research Group*
The sample of the study was composed of 1083 people in Turkey (Female n: 857 (79.1%); Male n: 226 (20.9%)). Distribution of participants by generation is given in Table 1.

**Table 1.** Distribution of the study group by generation

| Generations | Age range | n | % |
|---|---|---|---|
| Generation X | >45 | 93 | 8,6 |
| Generation Y | 30-45 | 288 | 26,6 |
| Generation Z | 15-30 | 702 | 64,8 |

The age range of the study group ranges from 15 to 67 and the mean age is 29. When the education status is examined, 60.2% are at the university, 14.6% are at the level of Master's, 10.1% are high school, 9.2% are at the School and 1.4% are at the elementary level.

### Data Collection Tool
### Uskudar XYZ Generation Differences Scale (USGDS)
In the process of developing the scale, the resources related to the characteristics and differences (behaviors, values, social media use, etc.) specified in the field for generations were examined and the item pool was built up. When preparing the item pool, the topics were determined and the subordination of the items linked to these headings was applied. The scale is prepared as a 5-point Likert type scale and is rated as "Not Suitable for Me", "Less Suitable for Me", "Medium Suitable for Me", "Very Suitable for Me" and "Completely Suitable for Me" to determine the participation in each expression. The high score from the draft scale indicates that the relevant value is high and at the same time the characteristics attributed to "generation Z" are at a high level; low score can be evaluated at a low level and at the same time it is assumed that the characteristics attributed to "generation X" are exhibited.

After the final arrangements were made on issues such as the expressions and contents of the articles by taking expert opinions, the draft scale was applied to a pilot group (n:15) from a different age to test the clarity and it was decided that it could be applied with 126 articles with the final expression arrangements made. When exploratory factor analysis was applied to the data obtained, the results were not satisfactory and did not show a meaningful structure. Thus, it was decided to apply the exploratory factor analysis separately by parsing the topics represented by the measuring instrument. In this context, 12 dimensions have been studied. Each dimension was treated as a separate scale under the USGDS heading, and validity and reliability studies were carried out on the dimensions separately.

### Process
**Translation Work:** To obtain the Turkish form of the Uskudar Generation Differences Scale (USGDS), the items in the original inventory was first translated into Turkish by an expert who is competent both in Turkish and English. Then, it was ensured that the sentences were understandable by checking them by two field experts who knew both languages well.

**Application of USGDS:** Ethical approval was given to the research by the Uskudar University Non-Interventional Research Ethics Committee with the number 61351342/TEMMUZ2021-23. The data collection process was carried out voluntarily by using an online survey form from 1st to 15th December 2021. The study group sample was randomly selected and consisted of people aged 15 and over. USGDS were administered to the participants via an online questionnaire and it took an average of 15 minutes to complete the questionnaire.

### Data Analysis
Pearson correlation coefficient was used for the linguistic equivalence of USGDS, which is to determine the consistency between the Turkish and English forms. It has been tested with the Kaiser Meyer Olkin (KMO) coefficient and Bartlett Sphericity test for validity and reliability studies on whether items of each scale are suitable for factor analysis. KMO value of 0.70 and above is "good" in terms of ensuring sample proficiency (Sipahi, Yurtkoru & Çinko, 2008); 0.80 and above is considered "excellent" (Sharma, 1996). Similarly, Bartlett Sphericity is expected to be $p<0.05$. No limit was imposed on the number of factors during factor analysis. The findings of each scale study are described under separate headings. If the difference between the items is 0.10, the relevant items are considered to be boarding and removed from the scale. Within the scope of the structure validity of the scale, the relationships of the resulting factors with each other and the total were also calculated. In the interpretation of the correlation values obtained, the relationship values between 0.30-0.70 are medium; Values above 0.70 are also considered to indicate a high relationship (Büyüköztürk, 2002:32).

For discriminant validity of the scale, the total validity of the sum of the scale and the subscales were viewed to the difference validity of the subscales. After the scale was scored, the scores were sorted and an independent

group t-test was applied to determine the difference between the scores of the people who were in the subgroup of 27% and the people who were in the upper group.

Within the scope of the reliability studies of the scale, the coefficients of item analysis and internal consistency (Cronbach α) were calculated. Sipahi, Yurtkoru & Çinko (2008) Cronbach α value is considered reliable in cases where the value of 0.70 or higher is considered reliable and in cases where the number of questions is less, 0.60 and above will suffice. In this study, the internal coefficients of consistency of the scales α Cronbach were interpreted and these values were accepted as criteria.

## FINDINGS

### Linguistic Equivalence Study of USGDS

The English and Turkish forms of the USGDS were administered to 20 postgraduate students at the Department of Psychology from Uskudar University three weeks apart in Turkish and English. After the applications, the Pearson correlation coefficient was calculated. The time interval between the two tests is specified as 2 to 4 weeks or 3 to 6 weeks according to different opinions in the literature (Özgüven, 1994).

It was made for two applications with USGDS including 12 scales. When the Pearson correlation coefficients were examined, the lowest value for scales was .45 and the highest value was .84, and the correlation coefficient between the total scores of the items in the Turkish and English forms was also found to be positive and significant (r: .77; p<0.001). In addition, according to the independent group t-test for scales, it was determined that there was no significant difference between the two applications (t: .36; df: 21; p>0.05). The results obtained showed that the consistency between the two applications of the scales was acceptable.

### 1. Organizational Commitment and Authority Scale

In this part of the study, evaluations were made on the scale-covered under the heading Organizational Commitment and Authority. Originally published as 14 items on draft scale and basic components analysis applied within the scope of scale's structure validity. When the Eigenvalue is 1 and the factor load interrupting value is released, it is observed that 3 items receive a low factor load. Thus, the process was repeated by removing 3 items from the scale. The suitability of the scale for the analysis of key components was evaluated by Kaiser Meyer Olkin (KMO) coefficient and Bartlett Sphericity test. According to the results obtained, the KMO value was found to be 0.92 and Bartlett Sphericity Chi-square value was 7135,510 (p:55; p<0,000). The KMO sampling adequacy value found suggests that the relationships between the variables are perfectly suited to factor analysis. Similarly, it is understood that there is a sufficient relationship between variables of the scale being developed to have a Bartlett Sphericity value of p<0.05.

Table 2 provides factors arising as a result of factor analysis, item factor loads, factor eigen value, and variance percentage of each factor. These subscales are called "Belongingness" and "Trust" by looking at the content of the items in the resulting subscales.

**Table 2.** Factor analysis results of Organizational Commitment and Authority Scale

| Factors | Items | Factor Load | Eigen Value | Variance Percentage |
|---------|-------|-------------|-------------|---------------------|
| Belongingness | 1. I believe that to advance my career, I must stay in the same institution and work for a certain time. | 0,69 | 5,76 | 52,43 |
| | 2. I believe that you have to be patient and work to step up in business. | 0,70 | | |
| | 3. My career or education is the most important part of my life. | 0,54 | | |
| | 4. I work hard for the success of the institution/group I am in, even if the financial value is not sufficient enough. | 0,70 | | |
| | 5. Being at peace at work is more important than wages. | 0,62 | | |
| | 6. I'd like to work in a place where teamwork comes to the fore. | 0,64 | | |
| Trust | 7. It's very important to me to go where I work lovingly. | 0,53 | 1,11 | 10,09 |
| | 8. I feel like doing the opposite of what the bossy one told me. | 0,78 | | |

| | | |
|---|---|---|
| 9. In the environment where I work, fear should be the exception, trust must be essential. | | 0,70 |
| 10. It is very important to me that the leader is fair and reassuring. | | 0,77 |
| 11. I care about someone else's rights and needs in human relations. | | 0,71 |
| Total | | 62,52 |

The relationship between the subscales that make up the Organizational Commitment and Authority Scale that occurs after factor analysis is medium (r: 0.50) and the relation to the total is high (Belongingness r: 0.96; Trust r: 0.72).

Within the scope of the validity of the difference of the Organizational Commitment and Authority Scale, the discriminant of each item, subscale and scale were looked at. In this context, an independent group t-test was applied between the lower and upper groups of 400 people, which amounted to 27% after the scores were sorted from high to low. All items of the scale were found to be distinctive at p<0.001 and the results were given in Table 3.

**Table 3.** Independent group t-test analysis of scale and subscales

| Factors | Groups | N | X | Sd | df | t | p |
|---|---|---|---|---|---|---|---|
| Belongingness | Upper Group | 400 | 20,15 | 3,4 | 798 | 51,01 | ,000 |
| | Lower Group | 400 | 10,07 | 2,0 | | | |
| Trust | Upper Group | 400 | 14,97 | 1,2 | 798 | 49,84 | ,000 |
| | Lower Group | 400 | 10,95 | 1,0 | | | |
| Organizational Commitment & Authority Scale | Upper Group | 400 | 34,38 | 4,5 | 798 | 48,12 | ,000 |
| | Lower Group | 400 | 21,96 | 2,4 | | | |

Later, when internal consistency Cronbach Alpha coefficients were examined, it was observed that the sum of the Organizational Commitment and Authority Scale was 0.69% internal consistency coefficient. The internal coefficient of consistency of the Belongingness dimension containing 6 items was found to be 0.81 and the Trust dimension containing 5 items was found to be 0.76. It has been concluded that the values provide internal consistency reliability. When evaluating the scale, all items except items 7 and 8 are reverse-coded. The lowest score on the scale is 11 points, and the highest score is 55. According to this; 13-29 points are considered as "Less level", 30-47 points as "Moderate", 48-65 points as "High Level".

**2. Self-Evaluation Scale**
Basic Components Analysis has been applied under the construction validity of the draft scale for evaluations of the scale addressed under the assessment title. In the initial factor analysis calculations with item 13, when the Eigenvalue 1 and the factor cutting value are released, it was observed that the 3 items were found to be involved in more than one factor by boarding and the analysis of the basic components was repeated by removing these items.

In the analysis of the basic components with 10 items, the suitability of the scale for factor analysis was evaluated by Kaiser Meyer Olkin (KMO) coefficient and Bartlett Sphericity test. According to the results obtained, the KMO value was found to be 0.76 and the Bartlett Sphericity chi-square value was 2511,196 (df:45; p<0,000). The values found showed that the relations between variables were in line with factor analysis. Accordingly, factors, item factor loads, eigenvalue and variance percentages that emerged as a result of factor analysis are given in Table 3. The content of the items in the resulting subscales is examined and named "Individualism and Convenience" and "Self- Esteem, and Self-Expression".

**Table 4.** Factor analysis results of a self-assessment scale

| Factors | Items | Factor Load | Eigen Value | Variance Percentage |
|---|---|---|---|---|
| Individualism and Convenience | 1. For me, the priority is my own needs, others come later. | 0,56 | 3,157 | 31,56 |
| | 2. I avoid setting goals that I'll have a hard time with. | 0,71 | | |
| | 3. I'm happy with what I get without effort. | 0,67 | | |
| | 4. When I'm faced with adversity, I don't tire myself out. | 0,79 | | |
| | 5. The idea of spending the day in peace rather than investing in the future is tempting. | 0,60 | | |
| Self-Esteem and Self-Expression | 6. I have complete confidence in myself in every environment, I do not shy away from anyone. | 0,78 | 1,727 | 17,27 |
| | 7. Even if I disagree with where the elders are, I can say my opinion differently in an appropriate style. | 0,77 | | |
| | 8. I express myself more freely on social media. | 0,57 | | |
| | 9. I'm confident on social media, I use aliases. | 0,50 | | |
| | 10. I can easily express an opposing opinion on social media without thinking about the consequences. | 0,61 | | |
| Total | | | | 48,84 |

The relationship between the subscales that make up the two-dimensional Self-Assessment Scale that occurs after factor analysis (r: 0.33) and its relation to the total (Individualism and Convenience r: 0.79; Self-Esteem and Self-Expression r: 0.83) examined, mid-level and changing relationships were detected. Within the scope of the validity of the Self-Assessment Scale, the discriminant of the sum of the scale and the subscales were looked at. In this context, an independent group t-test was applied between the lower and upper groups of 400 people, which amounted to 27% after the scores were sorted from high to low. All items of the scale were found to be distinctive at p<0.001 and the results were given in Table 5.

**Table 5.** Independent group t-test analysis of Self-Assessment Scale and subscales

| Factors | Groups | N | X | Sd | df | t | p |
|---|---|---|---|---|---|---|---|
| Individualism and Convenience | Upper Group | 400 | 14,95 | 2,6 | 798 | 52,07 | ,000 |
| | Lower Group | 400 | 7,07 | 1,4 | | | |
| Self-Esteem and Self-Expression | Upper Group | 400 | 17,71 | 2,5 | 798 | 55,46 | ,000 |
| | Lower Group | 400 | 9,04 | 2,9 | | | |
| Self-Assessment Scale | Upper Group | 400 | 30,91 | 4,4 | 798 | 49,90 | ,000 |
| | Lower Group | 400 | 17,62 | 2,9 | | | |

Cronbach Alpha internal consistency coefficients of subscale and scale were examined as part of reliability studies. Internal consistency of the scale total Cronbach Alpha coefficient is 0.75; 0.73 of individualism and convenience consisting of 5 items; the dimansion of self-esteem and self-expression of 5 items was found to be 0.70. These values were found to be sufficient for the reliability of the scale. There are no reverse-coded items when calculating the scale score. At least 10 points and up to 50 points can be obtained from the scale. According to this; 11-25 points are considered as "Less level", 26-40 points "Moderate", 41-55 points as "High Level"

**3. Friendship Bond Scale**
The draft scale, which is considered the Friendship Bond Scale, consists of 6 items. It was first applied with the Kaiser Meyer Olkin (KMO) coefficient and Bartlett Sphericity test, which were used to determine the suitability of the data set for factor analysis, and the results in which KMO value was found to be 0.70 and Bartlett Sphericity square value to 791,840 (df:15; p<000). The values found showed that the relationships between variables were in line with factor analysis. The 2-factor structure is obtained when Eigenvalue is 1 and factor cutting value is

released. Accordingly, factors, item factor loads, factor self-values, and variance percentages emerged as a result of factor analysis in Table 6 are given. The contents of the items in the resulting subscales were examined and named "Care" and "Escape".

**Table 6.** Factor analysis results of Friendship Bond Scale

| Factors | Items | Factor Load | Eigen Value | Variance Percentage |
|---------|-------|-------------|-------------|---------------------|
| Care | 1. I prefer my social media relationships to my daily relationships. | 0,77 | | |
| | 2. Friendship bond is important, social media is not his replacement. | 0,84 | 1,844 | 30,73 |
| | 3. I care about the opinions of my friends, but my inference comes first. | 0,63 | | |
| Escape | 4. After my family, I trust my friends the most. | 0,77 | | |
| | 5. I make friends quickly on social media, but as soon as it starts, it's over quickly. | 0,73 | 1,524 | 25,39 |
| | 6. I don't think communication tools like TV, social media are at the center of my life. | 0,66 | | |
| Total | | | | 56,12 |

The relationship between the subscales that make up the two-dimensional Friendship Bond Scale that occurs after the factor analysis (r: 0.55) and its relationship to the sum (Care r: 0.75; Escape r: 0.79) examined, mid-level and changing relationships were detected. Within the scope of the validity of the Friendship Bond Scale, the discriminant of the sum of the scale and the subscales were looked at. Thus, after the scores were sorted from high to low, an independent group t-test was applied between the lower and upper groups of 400 people, which amounted to 27%. All items of the scale were found to be distinctive at p<0.001 and the results were given in Table 7.

**Table 7.** Independent group t-test analysis of Friendship Bond Scale and subscales

| Factors | Groups | N | X | Sd | df | t | p |
|---------|--------|---|---|----|----|---|---|
| Care | Upper Group | 400 | 7,45 | 1,8 | 798 | 43,24 | ,000 |
| | Lower Group | 400 | 3,28 | 0,4 | | | |
| Escape | Upper Group | 400 | 10,28 | 1,8 | 798 | 58,77 | ,000 |
| | Lower Group | 400 | 4,11 | 0,9 | | | |
| Friendship Bond Scale | Upper Group | 400 | 15,94 | 2,1 | 798 | 56,59 | ,000 |
| | Lower Group | 400 | 8,59 | 1,5 | | | |

Cronbach Alpha internal consistency coefficients of subscale and scale were examined as part of reliability studies. Internal consistency of the scale total Cronbach Alpha coefficient is 0.62; The importance dimension of 3 items is 0.60; the Escape dimension of 3 items was found to be 0.64. These values are sufficient for the reliability of the scale. There are no reverse-coded items when calculating the scale score. At least 6 points and up to 30 points can be obtained from the scale. The 2nd, 4th, 6th items on the scale are inverted. According to this; 9-20 points are considered as "Less level", 21-32 points as "Moderate", 33-45 points as "High Level".

## 4. Popular Culture Scale
The draft scale considered as popular culture scale consists of 15 items. First of all, the Kaiser Meyer Olkin (KMO) used in determining the suitable of the data set for factor analysis and the KMO value is applied by the Bartlett Sphericity test and according to the results obtained 0.85 and Bartlett Sphericity Chi-square value 4770,135 (df: 78; p <0.000) has been found. The values found that the relations between variables are appropriate to the factor analysis. When the Eigenvalue 1 and the factor cutting value are released, the factor of the 2 items is lower than the factor load value is less repeated with 13 items, and a 3-factor structure was obtained. Accordingly, factors, item factor loads, eigenvalue, and variance percentages emerged as a result of factor analysis in Table 8. The

contents of the items on the resulting subscales were examined and named "Venue", "Consumption" and "Nostalgia".

**Table 8.** Factor analysis results of Popular Culture scale

| Factors | Items | Factor Load | Eigen Value | Variance Percentage |
|---|---|---|---|---|
| Venue | 1. Shopping mall, cafes make me happy, I want to spend more time . | 0,72 | 4,466 | 34,35 |
| | 2. I like to socialize outside instead of spending time alone at home with a smartphone . | 0,56 | | |
| | 3. Sitting and eating at the restaurant makes me happier than eating at home. | 0,82 | | |
| | 4. I feel more satisfied when I'm in popular places. | 0,63 | | |
| | 5. I'd rather eat out than cook at home. | 0,60 | | |
| Consumption | 6. I'd rather buy and wear electronics or appropriate clothes, even if I don't need them. | 0,55 | 2,132 | 16,39 |
| | 7. I see the need to save money, to live thrifty. | 0,59 | | |
| | 8. I review popular people's sites on social media like Instagram and try to apply their beauty recipes. | 0,70 | | |
| | 9. I get bored with electronics or clothes I buy quickly. | 0,76 | | |
| | 10. I keep track of new trendy outfits, music, venues. | 0,65 | | |
| Nostalgia | 11. It's a waste of me to spend too much money to beautify myself or look good. | 0,67 | 1,011 | 7,77 |
| | 12. New songs don't impress me, I'm happy to listen to nostalgic songs from the past. | 0,85 | | |
| | 13. I always think previous songs are up to date. | 0,80 | | |
| Total | | | | 58,53 |

The relationship of the subscales that make up the two-dimensional Popular Culture Scale that occurs after factor analysis (Venue & Consumption r: 0.49; Venue & Nostalgia r: 310; Consumption & Nostalgia r:0.40) and its relation to the total (Venue r: 0.76; Consumption r: 0.77; Nostalgia r: 0.52) examined, mid-level and above changing relationships were detected. Within the scope of the validity of the Popular Culture Scale, the discriminant of the sum of the scale with the subscales was looked at. Thus, after the scores were sorted from high to low, independent group t-tests were applied between the lower and upper groups of 400 people, which amounted to 27%. All items of the scale were found to be distinctive at p<0,001 and the results were given in Table 9.

**Table 9.** Independent group t-test analysis of Popular Culture Scale and subscales

| Factors | Groups | N | X | Sd | df | t | p |
|---|---|---|---|---|---|---|---|
| Venue | Upper Group | 400 | 14,57 | 1,57 | 798 | 47,78 | ,000 |
| | Lower Group | 400 | 9,86 | 1,18 | | | |
| Consumption | Upper Group | 400 | 13,30 | 3,2 | 798 | 45,34 | ,000 |
| | Lower Group | 400 | 5,74 | 0,7 | | | |
| Nostalgia | Upper Group | 400 | 11,19 | 1,4 | 798 | 63,76 | ,000 |
| | Lower Group | 400 | 4,89 | 1,3 | | | |
| Popular Culture Scale | Upper Group | 400 | 35,98 | 4,6 | 798 | 47,01 | ,000 |
| | Lower Group | 400 | 23,25 | 2,7 | | | |

Cronbach Alpha internal consistency coefficients of subscale and scale were examined as part of reliability studies. Internal consistency of the scale total Cronbach Alpha coefficient is 0.73; Venue dimension of 5 items is 0.71; Consumption dimension consisting of 5 items is 0.76; Nostalgia dimension consisting of 3 items was found to be 0.70. These values are sufficient for the reliability of the scale. 2nd, 3rd, 11th, 12th, 13th articles on the scale are inverted. The lowest score on the scale is 13 and the highest score is 65. According to this; 7-15 points are considered as "little level", 16-25 points as "Moderate", 26-35 points as "High Level".

### 5. Impulse Control Scale

The draft scale considered as Impulse Control Scale consists of 4 items. Kaiser Meyer Olkin (KMO) coefficient and Bartlett Sphericity test were used to determine the eligibility of the data set for factor analysis and according to the results obtained 0.85 and Bartlett Sphericity Chi-square value 4770,135 (SD: 78; p <0.000) were found. The values found that the relationships between variables are appropriate to the factor analysis. Eigenvalue 1 and the factor cutting value is released, the single-factor structure was obtained. Accordingly, the factor of a factor in Table 10 is given the factor of the item factor loads, eigenvalue, and variance percentage.

**Table 10.** Factor Analysis Results of Impulse Control Scale

| Factors | Items | Factor Load | Eigen Value | Variance Percentage |
|---|---|---|---|---|
| Impulse Control Scale | 1. When I see new season clothes or electronics in storefronts, I want to buy them right away, even if I don't need them. | 0,77 | | |
| | 2. Even if I'm not hungry in cafes and restaurants, I want to eat new dishes and desserts. | 0,75 | 2,082 | 52,04 |
| | 3. I'm always active on social media, and every time I try to disconnect, I say, "One more minute." | 0,75 | | |
| | 4. I follow the ideas of phenomena on social media if the comments on their pages are useful. | 0,57 | | |
| Total | | | | 52,04 |

Within the scope of the discriminant validity of the one-dimensional Impulse Control Scale that occurs after factor analysis, the distinguishing of the scale total was looked at. Thus, after the scores were sorted from high to low, independent group t-tests were applied between the lower and upper groups of 400 people, which amounted to 27%. All items of the scale were found to be distinctive at $p<0,001$ and the results were given in Table 11.

**Table 11.** Independent group t-test analysis of Impulse Control Scale total score distinguishing

| Factors | Groups | N | X | Sd | df | t | p |
|---|---|---|---|---|---|---|---|
| Impulse Control Scale | Upper Group | 400 | 11,78 | 1,9 | 798 | 45,99 | ,000 |
| | Lower Group | 400 | 6,65 | 1,0 | | | |

Within the scope of reliability studies, the Cronbach Alpha internal consistency coefficient of the 4-item scale was found to be 0.67. All items must be reverse-coded when calculating the score of the scale, which can be scored at least 4 points and a maximum of 20 points. According to this; 4-8 points are considered as "Less level", 9-14 points "Moderate", 15-20 points as "High Level".

### 6. Technology Use Scale

The draft scale discussed as the use of technology use is initially 12 items. First, the Kaiser Meyer Old (KMO) coefficient and Bartlett Sphericity test were used to determine the suitable of the data set for factor analysis and the KMO value is 0.89 and Bartlett Sphericity Chi-square value 4886,080 (df:55; p<0.000) has been found. The values found showed that the relationships between variables were in line with factor analysis. When the Eigenvalue of 1 and the factor cutting value are released, the factor load value of 1 item is eliminated because it is low, analysis is repeated with 11 items and a 3-factor structure is obtained. Accordingly, factors, item factor loads, eigenvalue, and variance percentages emerged as a result of factor analysis in Table 12 are given. The contents of the items in the resulting subscales were examined and named "Loyalty", " Satisfactoriness" and "Traditional Media Preference".

**Table 12.** Factor analysis results of the Technology Usage Scale

| Factors | Items | Factor Load | Eigen Value | Variance Percentage |
|---|---|---|---|---|
| Loyalty | 1. When I'm away from my smartphone, I feel incomplete, uneasy. | 0,78 | 4,817 | 43,79 |
| | 2. I always check my social media accounts before I go to sleep and immediately after I wake up. | 0,76 | | |
| | 3. I am constantly online/active with my mobile devices (tablets, phones, etc.). | 0,75 | | |
| | 4. I don't disconnect from social media while I'm reading and working. | 0,65 | | |
| Ability | 5. I can do every job using social media and internet. | 0,76 | 1,320 | 12,00 |
| | 6. I can manage all my activities (talk, game, bank shopping etc) over social media. | 0,79 | | |
| | 7. I active social media in all areas of my life. | 0,71 | | |
| | 8. I use at the same time both tablets, smartphone etc. and can do my other work too. | 0,73 | | |
| Traditional Media Preference | 9. My habit of listening to music on the radio isn't just on social media. | 0,68 | 1,068 | 9,70 |
| | 10. I prefer to watch series and movies on the TV, rather than their classic mediums. | 0,73 | | |
| | 11. I think I should get help using technological devices. | 0,63 | | |
| Total | | | | 65,50 |

The interrelated subscales that make up the three-dimensional Technology Usage Scale that occurs after factor analysis (Loyalty & Ability r: 0.66; Loyalty & Traditional Media Preference r: 0.24; Ability & Traditional Media Preference r:0,23) and its relation to the total (Loyalty r: 0.85; Qualification r: 0.86; Traditional Media Preference r: 0.71) examined, mid-level and changing relationships were detected. The discriminant of the subscales and the sum of the scale was looked at within the scope of the validity of the Technology Usage Scale. Thus, after the scores were sorted from high to low, independent group t-tests were applied between the lower and upper groups of 400 people, which amounted to 27%. All items of the scale were found to be distinctive at $p<0,001$ and the results were given in Table 13.

**Table 13.** Independent group t-test analysis of Technology Usage Scale and subscales

| Factors | Groups | N | X | Sd | df | t | p |
|---|---|---|---|---|---|---|---|
| Loyalty | Upper Group | 400 | 14,68 | 2,41 | 798 | 63,07 | ,000 |
| | Lower Group | 400 | 5,94 | 1,35 | | | |
| Ability | Upper Group | 400 | 15,25 | 2,57 | 798 | 63,18 | ,000 |
| | Lower Group | 400 | 5,92 | 1,43 | | | |
| Traditional Media Preference | Upper Group | 400 | 13,26 | 2,57 | 798 | 51,26 | ,000 |
| | Lower Group | 400 | 8,04 | 1,75 | | | |
| Technology Usage Scale | Upper Group | 400 | 39,37 | 4,70 | 798 | 55,85 | ,000 |
| | Lower Group | 400 | 23,74 | 3,03 | | | |

Cronbach Alpha internal consistency coefficients of subscale and scale were examined as part of reliability studies. Internal consistency of the scale total Cronbach Alpha coefficient is 0.78; Loyalty dimension of 4 items is 0.83; Ability dimension of 4 items is 0.87; Traditional Media Preference dimension consisting of 3 items was found to be 0.69. These values are sufficient for the reliability of the scale. 9th, 10th, 11th items on the scale are encoded in

reverse. The lowest score on the scale is 11 and the highest score is 55. According to this; 11-25 points are considered as "Less level", 26-40 points as "Moderate", 41-55 points as "High Level".

## 7. Social Norms Acceptance Scale

The basic components analysis was applied within the scope of the construct validity of the draft scale to be evaluated as the evaluations of the scale considered as an acceptance scale of social norms. In the analysis of key components initially, with 9 items, the suitability of the scale for factor analysis was evaluated by Kaiser Meyer Olkin (KMO) coefficient and Bartlett Sphericity test. According to the results obtained, the KMO value was found to be 0.80 and the Bartlett Sphericity Chi-square value was 4080,815 (df:36; $p<0,000$). The values found showed that the relationships between variables were in line with factor analysis.

Calculations were made by releasing Eigenvalue 1 and factor cutting value in basic components analysis. Accordingly, factors, item factor loads, eigenvalue, and variance percentages that emerged as a result of factor analysis are given in Table 14. The contents of the items in the resulting subscales are examined and named "Tolerance" and "Acceptance".

**Table 14.** Factor analysis results of the Social Norms Acceptance Scale

| Factors | Items | Factor Load | Eigen Value | Variance Percentage |
|---|---|---|---|---|
| Tolerance | 1. It bothers me to have intimate friends of different races, religious beliefs. | 0,55 | 4,040 | 44,88 |
| | 2. I don't get intimate with people from different ethnic groups. | 0,67 | | |
| | 3. I feel sorry for someone who's got a nose ring/piercing on various parts of his body. | 0,62 | | |
| | 4. If I were an employer, I wouldn't prefer someone with tattoos all over their body. | 0,74 | | |
| | 5. I immediately disconnect from those who have an outlier view on social media. | 0,78 | | |
| | 6. I don't want to see people with outlier value choices in my family circle. | 0,85 | | |
| | 7. It bothers me to be friends with someone with an outlier lifestyle.. | 0,82 | | |
| Acceptance | 8. I can join collaborating groups with people of different races, religious beliefs. | 0,85 | 1,443 | 16,03 |
| | 9. I consider it culturally natural to wear ornament (piercings) on your nose, eyebrows, tongue. | 0,83 | | |
| Total | | | | 60,92 |

The relationship between the subscales that make up the two-dimensional Social Norms Acceptance Scale that occurs after factor analysis (r: 0.31) and its relation to the sum (Tolerance r: 0.94; Acceptance r: 0.59) examined, mid-level and above changing, relationships were detected. Within the scope of the validity of the Social Norms Acceptance Scale, the discriminant of the sum of scale and the subscales were looked at. Thus, after the scores were sorted from high to low, independent group t-tests were applied between the lower and upper groups of 400 people, which amounted to 27%. All items of the scale were found to be distinctive at $p<0,001$ and the results were given in Table 15.

**Table 15.** Independent group t-test analysis Social Norms Acceptance Scale and subscales

| Factors | Groups | N | X | Sd | df | t | p |
|---|---|---|---|---|---|---|---|
| Tolerance | Upper Group | 400 | 33,63 | 1,48 | 798 | 53,15 | ,000 |
| | Lower Group | 400 | 21,10 | 4,47 | | | |
| Acceptance | Upper Group | 400 | 9,58 | 0,65 | 798 | 72,30 | ,000 |
| | Lower Group | 400 | 4,36 | 1,29 | | | |
| Social Norms | Upper | 400 | 42,04 | 2,33 | 798 | 57,07 | ,000 |

| Acceptance Scale | Group | | | |
|---|---|---|---|---|
| | Lower Group | 400 | 26,92 | 4,75 |

Cronbach Alpha internal consistency coefficients of subscale and scale were examined as part of reliability studies. Internal consistency of the scale total Cronbach Alpha coefficient is 0.83; Tolerance dimension of 7 items is 0.86; Acceptance dimension of 2 items is 0.71. These values are sufficient for the reliability of the scale. All other items are inversely encoded except items 8 and 9 when calculating the scale score. A minimum score of 9 points and a maximum of 45 points can be obtained from the scale. According to this; 9-20 points are considered as "Less level", 21-32 points as "Moderate", 33-45 points as "High Level".

## 8. Multiple Attention Scale

To make evaluations of the scale treated as Multiple Attention Scale, basic components analysis was applied within the scope of the structure validity of the draft scale. In the analysis of key components initially, with 7 items, the suitability of the scale for factor analysis was evaluated by Kaiser Meyer Olkin (KMO) coefficient and Bartlett Sphericity test. Chi-square value. The values found showed that the relationships between variables were in line with factor analysis.

Two factors emerged in the calculations made by releasing the Eigenvalue 1 and the factor cut value in the analysis of the basic components. When the content of the items on the subscales is examined, it is decided that it is related to "Multi-Attention" and "Single Focus". Accordingly, factors, item factor loads, eigenvalue, and variance percentages that emerged as a result of factor analysis are given in Table 16.

**Table 16.** Factor analysis results of Multiple Attention Scale

| Factors | Items | Factor Load | Eigen Value | Variance Percentage |
|---|---|---|---|---|
| Multiple Attention | 1. I can pay attention to several technological devices (tablets, smartphones, TVs) at the same time. | 0,84 | 2,643 | 37,75 |
| | 2. I can easily track them when I open multiple apps on my computer or smartphone. | 0,85 | | |
| | 3. Since I'm too sensitive to the surroundings, I can also notice another person or events while listening to one person. | 0,73 | | |
| | 4. And when I'm busy with my phone, I can listen to what the other people are saying. | 0,79 | | |
| Single Focus | 5. I think I can focus on one job at a time. | 0,80 | 2,164 | 30,91 |
| | 6. When I'm reading a book or a newspaper/magazine, I can't focus on anything else at the same time. | 0,85 | | |
| | 7. When I'm given another job doing my job, I think I can't be productive. | 0,84 | | |
| Total | | | | 68,66 |

The relationship between the subscales that make up the two-dimensional Multi-Attention Scale that occurs after factor analysis (r: 0.42) and its relation to the total (Multiple Attention r: 0.80; Single Focus (r: 0.63) examined, mid-level and above changing relationships were detected. The discriminant validity of the Multiple Attention Scale looked at the distinguishing of the sum of scales with subscales. Thus, after the scores were sorted from high to low, independent group t-tests were applied between the lower and upper groups of 400 people, which amounted to 27%. All items of the scale were found to be distinctive at p<0,001 and the results were given in Table 17.

**Table 17.** Independent group t-test analysis of Multiple Attention Scale and subscales

| Factors | Groups | N | X | Sd | df | t | p |
|---|---|---|---|---|---|---|---|
| Multiple Attention | Upper Group | 400 | 16,13 | 2,29 | 798 | 62,90 | ,000 |
| | Lower Group | 400 | 7,16 | 1,68 | | | |
| Single Focus | Upper | 400 | 11,86 | 1,49 | 798 | 68,80 | ,000 |

| | Group | | | | | | |
|---|---|---|---|---|---|---|---|
| | Lower Group | 400 | 4,86 | 1,38 | | | |
| Multiple Attention Scale | Upper Group | 400 | 25,52 | 3,50 | 798 | 50,26 | ,000 |
| | Lower Group | 400 | 14,45 | 2,67 | | | |

Cronbach Alpha internal consistency coefficients of subscale and scale were examined as part of reliability studies. Internal consistency of the scale total Cronbach Alpha coefficient is 0.70; Multiple Attention dimension consisting of 4 items 0.82; Single Focus dimension consisting of 3 items is calculated as 0.79. These values are sufficient for the reliability of the scale. 5th, 6th, 7th items are inverted when calculating scale scores. At least 7 points and up to 35 points can be obtained from the scale. According to this; 7-15 points are considered as "Less Level", 16-25 points as "Moderate", 26-35 points are considered as "High Level".

**9. Work Liking Scale**
To make evaluations of the scale treated as The Work Liking Scale, basic components analysis was applied within the scope of the structure validity of the draft scale. In the analysis of key components initially, with 8 items, the suitability of the scale for factor analysis was evaluated by Kaiser Meyer Olkin (KMO) coefficient and Bartlett Sphericity test. According to the results, the KMO value was found to be 0.75, and Bartlett's Sphericity Chi-square value was 3574,999 (df:21; p<0,000). The values found showed that the relationships between variables were in line with factor analysis.

In the calculations made by releasing the Eigenvalue 1 and the factor cutting value in the analysis of the basic components, the operation was repeated by removing the 1 item factor load from the scale because it was low and two factors emerged. When the content of the items on the subscales is examined, it is decided that it is related to "Abstain from Work" and "Belief in Working". Accordingly, factors, item factor loads, eigenvalue, and variance percentages emerged as a result of factor analysis in Table 18.

**Table 18.** Factor analysis results of the Work Liking Scale

| Factors | Items | Factor Load | Eigen Value | Variance Percentage |
|---|---|---|---|---|
| Abstain from Work | 1. The idea of making money from hard work comes to me attractive. | 0,85 | 3,153 | 45,04 |
| | 2. I'd rather work a lot of work I can jump in a short time. | 0,83 | | |
| | 3. I would be unhappy while working | 0,70 | | |
| Belief in Working | 4. I believe I can come somewhere by working. | 0,84 | 1,873 | 26,76 |
| | 5. I'm not restless when working I'll believe that I'll get the worth later. | 0,86 | | |
| | 6. I don't even think of my goal even if I'm experiencing difficulties while working. | 0,88 | | |
| | 7. While the conditions get hard I believe I have to finish the work I started. | 0,86 | | |
| Total | | | | 71,80 |

The relation of the subscales that form the two-dimensional work-liking scale of the two-dimensional operation after the factor analysis (R: 0.37) and the total relationship between each other (escape from work: 0.53; belief r: 0.76) were examined, moderate relationships were examined. Within the scope of the validity of the work-liking discriminant, the distinguishing of the sum of the scale with the subscales was looked at. Thus, after the scores were sorted from high to low, independent group t-tests were applied between the lower and upper groups of 400 people, which amounted to 27%. All items of the scale were found to be distinctive at p<0,001 and the results were given in Table 19.

**Table 19.** Independent group t-test analysis of Work Liking Scale and subscales

| Factors | Groups | N | X | Sd | df | t | p |
|---|---|---|---|---|---|---|---|
| Abstain from Work | Upper Group | 400 | 10,66 | 1,68 | 798 | 64,35 | ,000 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Lower Group | 400 | 4,26 | 1,04 | | | |
| Belief in Work | Upper Group | 400 | 13,03 | 2,60 | 798 | 61,17 | ,000 |
| | Lower Group | 400 | 4,65 | 0,83 | | | |
| Work Liking Scale | Upper Group | 400 | 20,79 | 2,35 | 798 | 59,14 | ,000 |
| | Lower Group | 400 | 11,02 | 2,31 | | | |

Cronbach Alpha internal consistency coefficients of subscale and scale were examined as part of reliability studies. Internal consistency of the scale total Cronbach Alpha coefficient is 0.73; Escape from Work dimension of 3 items is 0.72; The Belief in Working dimension consisting of 4 items was calculated as 0.89. These values are sufficient for the reliability of the scale. 4th, 5th, 6th, 7th items are reverse-coded when calculating scale scores. At least 7 points and up to 35 points can be obtained from the scale. According to this; 7-15 points are considered as "Less Level", 16-25 points as "Moderate", 26-35 points as "High Level".

**10. Internal Control Scale**
The draft scale considered as an internal control scale consists of 20 items. First of all, the Kaiser Meyer Olkin (KMO) used in determining the suitability of the data set for factor analysis and is applied by Bartlett Sphericity test and according to the results obtained 0.89 and Bartlett Sphericity Chi-square value 6753,434 (sd: 153; p <0.000) has been found. The values found that the relationships between variables are appropriate to the factor analysis. The Eigenvalue 1 and factor cutting value is released when the factor load value of the 2 items is low, the analysis was repeated with 18 items and a 3-factor structure was obtained. Accordingly, factors, item factor loads, eigenvalue, and variance percentages arising as a result of factor analysis are given in Table 20. The content of the items in the resulting subscales was examined and named "Emotional Control", "Desire Control" and "Sexual Control".

**Table 20.** Factor analysis results of Internal Control Scale

| Factors | Items | Factor Load | Eigen Value | Variance Percentage |
|---|---|---|---|---|
| Emotional Control | 1. If it lowers my mood, I'd rather avoid the truth. | 0,66 | 5,512 | 30,62 |
| | 2. Most of the time I can't control my fears . | 0,67 | | |
| | 3. I can't control my anger most of the time. | 0,56 | | |
| | 4. I don't like it when I'm criticized. | 0,61 | | |
| | 5. I can't stand it when I'm asked stupid questions. | 0,66 | | |
| | 6. I can't rest until I convince the other person that I know right. | 0,54 | | |
| | 7. My mood changes when I don't have something I want. | 0,69 | | |
| Desire Control | 8. I can make a realistic assessment of the afterlife. | 0,60 | 2,565 | 14,25 |
| | 9. I'm usually positive, I don't despair. | 0,72 | | |
| | 10. I can control my sexual desires . | 0,67 | | |
| | 11. I think I'm humbled. | 0,75 | | |
| | 12. When I'm shopping, I stop and think and then I decide. | 0,73 | | |
| | 13. I can think solution-oriented, not problem-oriented, by facing problems. | 0,82 | | |
| | 14. You could say I usually live on a plan. | 0,72 | | |
| | 15. I can adjust my sleep patterns most of the time. | 0,61 | | |
| | 16. I can be happy with little things . | 0,71 | | |
| Sexual Control | 17. I don't think comfortable sex life is a problem. | 0,82 | 1,319 | 7,32 |
| | 18 I can be with someone I meet on social media. | 0,73 | | |
| Total | | | | 52,20 |

The relationship of the subscales that make up the three-dimensional Internal Control Scale that occurs after factor analysis (Emotional Control & Desire Control r: 0.31; Emotional Control & Sexual Control r: 0.30; Desire Control & Sexual Control r:0.69) and its relationship to total (Emotional Control r: 0.45; Desire Control r: 0.66; Sexual Control r: 0.32) examined, moderately changing relationships were detected. Within the scope of the validity of the Internal Control Scale, the discriminant of the sum of the scale and the subscales were looked at. Thus, after the scores were sorted from high to low, independent group t-tests were applied between the lower and upper groups of 400 people, which amounted to 27%. All items of the scale were found to be distinctive at p<0,001 and the results were given in Table 21.

**Table 21.** Independent group t-test analysis of Internal Control Scale and subscales

| Factors | Groups | N | X | Sd | df | t | p |
|---|---|---|---|---|---|---|---|
| Emotional Control | Upper Group | 400 | 24,48 | 3,36 | 798 | 54,96 | ,000 |
| | Lower Group | 400 | 12,97 | 2,49 | | | |
| Desire Control | Upper Group | 400 | 29,67 | 5,56 | 798 | 51,30 | ,000 |
| | Lower Group | 400 | 13,96 | 2,55 | | | |
| Sexual Control | Upper Group | 400 | 6,91 | 1,55 | 798 | 58,77 | ,000 |
| | Lower Group | 400 | 2,20 | 0,40 | | | |
| Internal Control Scale | Upper Group | 400 | 52,99 | 4,29 | 798 | 55,67 | ,000 |
| | Lower Group | 400 | 35,59 | 4,53 | | | |

Cronbach Alpha internal consistency coefficients of subscale and scale were examined as part of reliability studies. Internal consistency of the scale total Cronbach Alpha coefficient is 0.65; Emotional Control dimension consisting of 7 items is 0.77; Desire Control dimension consisting of 9 items is 0.88; Sexual Control dimension consisting of 2 items was found to be 0.60. These values are sufficient for the reliability of the scale. All items (range 8 to 16) in the size of desire control on the scale are inverted. The lowest score on the scale is 18 and the highest score is 90. According to this; 18-41 points are considered as "Less level", 42-65 points as "Moderate", 66-90 points as "High Level".

## 11. Impatience Scale

The draft scale, which is considered the Impatience Scale, consists of 5 items. It was applied with the Kaiser Meyer Olkin (KMO) coefficient and Bartlett Sphericity test used to determine the suitability of the data set for factor analysis, and the results in which KMO value was found to be 0.77 and Bartlett Sphericity Chi-square value 1080,201 (df:10; p<0,000) was found. The values found showed that the relationships between variables were in line with factor analysis. The single-factor structure is obtained when Eigenvalue 1 and factor cutting value are released. Accordingly, the factor resulting from factor analysis in Table 22, item factor loads, eigenvalue and variance percentage is given.

**Table 22.** Factor analysis results of the Impatience Scale

| Factors | Items | Factor Load | Eigen Value | Variance Percentage |
|---|---|---|---|---|
| Impatience Scale | 1. I can't usually stand waiting in line at places like banks, grocery stores, hospitals. | 0,71 | 2,46 | 50,00 |
| | 2. I can apply to the internet immediately to get something I want. | 0,65 | | |
| | 3. Even if I can't afford it, I try to find an opportunity to get something I like. | 0,72 | | |
| | 4. When I don't get what I want at that moment, I get depressed. | 0,77 | | |
| | 5. It's a grind to be patient with people who think differently. | 0,62 | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Total | | | | | | | 50,00 |

Within the scope of the discriminant validity of the one-dimensional Impatience Scale that occurs after factor analysis, the distinguishing of the scale total was looked at. Thus, after the scores were sorted from high to low, an independent group t-test was applied between the 400-person sub-and Upper Groups, which amounted to 27%. All items of the scale were found to be distinctive at p<0.001 and the results were given in Table 23.

**Table 23.** Independent group t-test analysis of Impatience Scale

| Factors | Groups | N | X | Sd | df | t | p |
|---|---|---|---|---|---|---|---|
| Impatience Scale | Upper Group | 400 | 16,76 | 2,73 | 798 | 55,58 | ,000 |
| | Lower Group | 400 | 7,86 | 1,65 | | | |

Within the scope of reliability studies, the Cronbach Alpha internal consistency coefficient of the 5-item scale was found to be 0.74. A minimum score of 5 and a maximum of 25 points can be obtained. According to this; 5-11 points are considered as "Less level", 12-18 points as "Moderate", 19-25 points as "High Level".

## 12. Family Values Scale

The draft scale treated as family values scale consists of 16 items. First of all, the Kaiser Meyer Olkin (KMO) coefficient and Bartlett Sphericity test were used to determine the eligibility of the data set for factor analysis, and according to the results obtained 0.88 and Bartlett Sphericity Chi-square value 9067,163 (df:120; p<0.000) has been found. The values found that the relationships between variables are appropriate to the factor analysis. Eigenvalue 1 and the factor cut value is released, 3-factor structure was obtained. Accordingly, factors arising as a result of factor analysis, item factor loads, eigenvalue, and variance percentages are given in Table 24. The contents of the items in the resulting subscales were examined and named "Importance to Marriage", "Escape from Marriage" and "Freedom".

**Table 24.** Factor analysis results of the Family Values Scale

| Factors | Items | Factor Load | Eigen Value | Variance Percentage |
|---|---|---|---|---|
| Importance to Marriage | 1. I think marriage increases love and trust between couples. | 0,82 | 5,505 | 34,40 |
| | 2. Marriage ensures that someone will be happen who will be able to eliminate my loneliness and share my feelings. | 0,83 | | |
| | 3. I think marriage is important for the continuation of the generation. | 0,80 | | |
| | 4. I think a life without marriage would be incomplete. | 0,70 | | |
| | 5. I think marriage also played a role in streamlining income planning. | 0,77 | | |
| | 6. I consider the family institution important as the basic building block of society. | 0,72 | | |
| | 7. Marriage prevents unnecessary expenses. | 0,58 | | |
| Escape from Marriage | 8. I don't think marriage is necessary to have children. | 0,83 | 3,413 | 21,32 |
| | 9. The idea that marriage provides a regular life does not appeal to me. | 0,55 | | |
| | 10. No marriage is required to live life together. | 0,85 | | |
| | 11. I would see more appropriate to live together without a wedding. | 0,82 | | |
| Freedom | 12. I think marriage is a hindrance to my freedom. | 0,73 | 1,367 | 8,54 |
| | 13. I don't think it's entirely possible to live a comfortable life as long as there's a marriage. | 0,77 | | |
| | 14. If I'll marry/I'm married, I think I can't spend as easily as I did before. | 0,79 | | |

| | | |
|---|---|---|
| 15. When I'll marry/I'm married when I don't get what I want, I think I'm going to miss/I miss my previous way of life. | 0,78 | |
| 16. I think I'll live more comfortably if I'm not married. | 0,61 | |
| Total | | 64,27 |

The relationship of the subscales that make up the three-dimensional Family Values Scale that occurs after factor analysis (Importance to Marriage & Escape from Marriage r: 0.34; Importance to Marriage & Freedom r: 0.82; Marriage Escape & Freedom r:0.54) and its relationship with the total (Importance to Marriage r: 0.74; Escape from Marriage r: 0.78; Freedom r: 0.66) examined, moderately changing relationships detected. The discriminant of the subscales and the sum of the scale was looked at within the scope of the validity of the family values scale. Thus, after the scores were sorted from high to low, independent group t-tests were applied between the lower and upper groups of 400 people, which amounted to 27%. All items of the scale were found to be distinctive at p<0,001 and the results were given in Table 25.

**Table 25.** Independent group t-test analysis of Family Values Scale and subscales

| Factors | Groups | N | X | Sd | df | t | p |
|---|---|---|---|---|---|---|---|
| Importance to Marriage | Upper Group | 400 | 26,79 | 3,63 | 798 | 69,50 | ,000 |
| | Lower Group | 400 | 11,36 | 2,54 | | | |
| Escape from Marriage | Upper Group | 400 | 12,39 | 3,60 | 798 | 46,51 | ,000 |
| | Lower Group | 400 | 4,00 | 0,50 | | | |
| Freedom | Upper Group | 400 | 16,81 | 3,76 | 798 | 51,73 | ,000 |
| | Lower Group | 400 | 6,52 | 1,29 | | | |
| Family Values Scale | Upper Group | 400 | 50,73 | 8,33 | 798 | 53,15 | ,000 |
| | Lower Group | 400 | 25,81 | 4,29 | | | |

Cronbach Alpha internal consistency coefficients of subscale and scale were examined as part of reliability studies. Internal consistency of the scale total Cronbach Alpha coefficient is 0.86; The "Importance to Marriage" dimension consisting of 7 items is 0.87; The dimension of "Escape from Marriage" consisting of 4 items is 0.86; The dimension of "Freedom" consisting of 5 items was found to be 0.83. These values are sufficient for the reliability of the scale. The "Importance to Marriage" dimension on the scale, i.e. the first 7 items, are inversely encoded. The lowest score to be taken from the scale is 16, the highest score is 80. According to this; 16-36 points are considered as "Less Level", 37-58 points "Moderate", 59-80 points as "High Level".

**CONCLUSION AND DISCUSSION**
In this study, several scales have been developed to reveal the technology use, value, and behavior of different generations. The common point of the scales is that the items are attributed to different generations (values and behaviors). Thus, if high scores are obtained from the scales, the perspective of the generation is added to the measured subject. If high scores are obtained from the scales, proximity to generation Z can also be evaluated as proximity to generation X if a low score is obtained.

Uskudar XYZ Generation Differences Scale consists of 12 independent scales in itself. As a result of the exploratory factor analysis studies carried out with a single pool of items initially built up, it was decided to separate the items originally built up according to the subjects and to carry out validity and reliability studies separately. Validity and reliability studies carried out in this direction have revealed the appropriate structures. It has been observed that the scales are divided into subscales within themselves and exhibit a suitable relationship. In the discriminant studies, it was found that the characteristics to be measured can be measured, that is, the dimensions and scale totals provide distinctiveness.

Thus, the scales resulting from the scale development study are given appropriate names. Accordingly, the items and dimensions of each of the scales called (1) Organizational Commitment and Authority Scale, (2) Self-Evaluation Scale, (3) Friendship Bond Scale, (4) Popular Culture Scale, (5) Impulse Control Scale, (6) Technology Use Scale, (7) Social Norms Acceptance Scale, (8) Multiple Attention Scale, (9) Work-Liking Scale, (10) Internal Control Scale, (10) Internal Control Scale, (11) Impatience Scale (12) Family Values Scale are explained under separate headings. For the evaluation of scales, the highest score and the lowest score are divided into three equal ranges, with evaluation intervals of "Low Level", "Intermediate" and "High Level" determined. The evaluation intervals of each scale are calculated and indicated above. The scales are of 5-point Likert type and are rated as "Not Suitable for Me", "Less Suitable for Me", "Medium Suitable for Me", "Very Suitable for Me" and "Completely Suitable for Me" to determine the participation in each expression.

As a result, the Uskudar XYZ Generation Differences Scale consists of 12 independent scales in itself, so each can be used individually or can produce stronger results when used in an all-in-one. Generational work is needed with this series of scales that emerge as valid and reliable. Validity and reliability studies of scales can be re-performed in studies in different sample groups, and linguistic equivalence studies can be performed and adapted to different languages by making linguistic equivalence.

## REFERENCES

Adıgüzel, O., Batur, H. Z., & Ekşili, N. (2014). Kuşakların değişen yüzü ve y kuşağı ile ortaya çıkan yeni çalışma tarzı: Mobil yakalılar [Generation's changing side and the newly arisen work style after y-generation: mobile collars]. *Journal of Suleyman Demirel University Institute of Social Sciences, 19*(1), 165–182.

Akdemir, A., Konakay, G., Demirkaya, H., Noyan, A., Demir, B., Ağ, C., and et.al. (2013). Y kuşağının kariyer algısı, kariyer değişimi ve liderlik tarzı beklentilerinin araştırılması [The investigation of relationship between organizational an investigation of expectations of career perception and change, and leadership style of generation y]. *Ekonomi ve Yönetim Araştırmaları Dergisi, 2*(2), 11–42.

Alwin, D.F. ve Mccammon, R.J. (2007). Rethinking generations. *Research in Human Development, 4* (3-4), 219–370.

Asmafiliz, E., & Şalvarcı Türeli, N. (2018). Y kuşağı bireylerin sosyal medya kullanım sıklığı üzerine amprik bir araştırma [An empirical research on the frequency of social media use of millennials.]. *5th International Conference on Social Sciences and Education Research, Proceeding Book,* 294–312.

Bayramoğlu, G., Şahin, M. (2017). Field study investigating the expectations of employment and tendencies of the generations Y. *Journal of Labour Relations, 8*(2), 56–75.

Berkup, S. B. (2014). Working with generations X and Y in generation Z period: Management of different generations in business life. *Mediterranean Journal of Social Sciences, 5*(19), 218–229.

Börü, D. E. & Yurtkoru, E. S. (2016). Yeni kuşakların iş yaşamı tarzları üzerine ölçek geliştirme çalışması [A scale development study on the business life styles of new generations.]. *Adana Çukurova University IVth Organizational Behavior Congress Proceeding Book*, 64–68.

Büyüköztürk, Ş. (2002). Sosyal bilimler için veri analizi el kitabı [Handbook of data analysis for social sciences]. PegemA Publishing.

Deniz, L. & Tutgun Ünal, A. (2019). Sosyal medya çağında kuşakların sosyal medya kullanımı ve değerlerine yönelik bir dizi ölçek geliştirme çalışması [Development of a set of scales toward the use of social media and values of generations in social media age]. *OPUS–Uluslararası Toplum Araştırmaları Dergisi [International Journal of Society Researches], 11*(18), 1025–1057. DOI: 10.26466/opus.557240

Ekinci, Y., Tutgun-Ünal, A., Bayse, R., Ekinci, A. & Tarhan, N. (2021). Siberkondri, sağlık okuryazarlığı ve sosyo-ekonomik statü ilişkisi bağlamında x ve y kuşağına yönelik bir araştırma [A research of x and y generations in the context of the relationship between cyberchondry, health literacy and socio-economic status]. *İstanbul Arel Üniversitesi İletişim Çalışmaları Dergisi [Istanbul Arel University Communication Studies Journal], 9*(20), 117–148.

Ekşili, N., & Antalyalı, Ö.L. (2017). Türkiye'de Y kuşağı özelliklerini belirlemeye yönelik bir çalışma: Okul yöneticileri üzerine bir araştırma [A study to determine the characteristics of generation y in Turkey: A survey on school administrators]. *Humanities Sciences* (NWSAHS), 12(3), 90–111. http://dx.doi.org/10.12739/NWSA.2017.12.3.4C0219

Engizek, N., & Şekerkaya, A. (2016). X ve Y kuşağı kadınlarının karar verme tarzları bakımından incelenmesi, *Mustafa Kemal Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 13*(36), 242–271.

Kelgökmen İlic, D., & Yalçın, B. (2017). Y jenerasyonunun farklılaşan iş değerleri ve liderlik algılamaları [Differentiated job values and leadership perceptions of gen y]. *Journal of Yaşar University, 12*(46), 136–160.

Kuyucu, M. (2017). Y kuşağı ve teknoloji: Y kuşağının iletişim teknolojilerini kullanım alışkanlıkları [Y generation and technology: The use of communication technologies in y generation]. *Gümüşhane*

*Üniversitesi İletişim Fakültesi Elektronik Dergisi [Gümüşhane University e-Journal of Faculty of Communication]*, *5*(2), 845–872.

Latif, H., & Serbest, S. (2014). Türkiye'de 2000 kuşağı ve 2000 kuşağının iş ve çalışma anlayışı [Generation 2000 in Turkey and generation 2000's business and working concept]. *Gençlik Araştırmaları Dergisi, 2*(4), 132–163.

Morsümbül, Ş. (2014). Kültürel değerlerin üç kuşak arasındaki değişimi üzerine bir inceleme: Ankara örneği [A study on the cultural value change across three generations: Ankara sample]. *Hacettepe Üniversitesi Türkiyat Araştırmaları Dergisi [University Journal of Turkish Studies/HÜTAD]*, 21, 137–160.

Mücevher, M. H. (2015). X ve Y Kuşağının Birbirlerine Karşı Özellik ve Etkileşim Algıları: SDÜ Örneği [Characteristics and interaction perceptions of x and y generations against each other: SDU sample]. *Unpublished Master Thesis*, Süleyman Demirel University, Isparta, Turkey.

Özdemir, Ş. (2021). Sosyal medya çağında kuşakların medya kullanım alışkanlıklarının incelenmesi [Examination of media use habits of generations in the age of social media]. *İstanbul Arel Üniversitesi İletişim Çalışmaları Dergisi [Istanbul Arel University Communication Studies Journal]*, 9(20), 281–308.

Özgüven, İ. E. (1994). Psikolojik testler [Psychological tests]. Yeni Doğuş Matbaası, Ankara, Turkey.

Seligman, M. (2019). Positive Psychology: A Personal History. *Annual Review of Clinical Psychology*, 15, 1–23.

Sharma, S. (1996). Applied Multivariate Techniques. John Wiley & Sons Inc, New York.

Sipahi, B., Yurtkoru, E.S., & Çinko, M. (2008). *Sosyal bilimlerde SPSS'le veri analizi [Data analysis with SPSS in social sciences]*. Beta.

Süer, S., Sezgin, K., & Oral, B. (2017). Z kuşağındaki öğrencilerin internete ilişkin algılarının belirlenmesi: Bir metafor çalışması [Generation z students' perceptions of internet: A metaphor study]. *Elektronik Eğitim Bilimleri Dergisi [Electronic Journal of Educational Science]*, 6(12), 190–203.

Tarhan, N. (2015). *Değerler Psikolojisi ve İnsan [Psychology of values and human].* Timaş Publishing.

Tarhan, N. (2019). *10 Adımda Pozitif Psikoloji [10 steps positive psychology].* Timaş Publishing.

Tarhan, K. N. (2020). "*Doğru bir politika üretemezsek Z kuşağı kayıp kuşak olacak*", Access: https://www.nevzattarhan.com/dogru-bir-politika-uretemezsek-z-kusagi-kayip-kusak-olacak.html

Tarhan, N., & Tutgun-Ünal, A. (2021). *Sosyal medya psikolojisi [Social media psychology].* Der Publishing.

Taş, H. Y., Demirdöğmez, M., & Küçükoğlu, M. (2017). Geleceğimiz olan Z kuşağının çalışma hayatına muhtemel etkileri [Possible effects of future architects' z generation on business life]. *OPUS-Uluslararası Toplum Araştırmaları Dergisi [International Journal of Society Researches]*, *7*(13), 1031–1048.

Tolbize, A. (2008). *Generational differences in the workplace*. Research and Training Center on Community Living: University of Minnesota.

Toruntay, H. (2011). Takım rolleri çalışması: X ve Y kuşağı üzerinde karşılaştırmalı bir araştırma. *Yayımlanmamış Yüksek Lisans Tezi [Unpublished Master Thesis],* İstanbul University, İstanbul, Turkey.

Tutgun-Ünal, A. (2013). Nesiller ayrılıyor: X, Y ve Z nesilleri [XYZ Generations]. Açıkbilim, Access: http://www.acikbilim.com/2013/09/dosyalar/nesiller-ayriliyor-x-y-ve-z-nesilleri.html

Tutgun-Ünal, A. (2021). Social media generations' levels of acceptance of diversity. *TOJET: The Turkish Online Journal of Educational Technology, 20*(2), 155–168.

Tutgun-Ünal, A., & Deniz, L. (2020). The Comparison of Work Values of Social Media Generations in terms of Giving Importance to Work and Obeying The Rules in Turkey. *Azerbaijan Journal of Educational Studies,* 690, 199–220. http://dx.doi.org/10.29228/edu.102.

Tutgun-Ünal, A., Tarhan, N., Muradi, P., & Kurt, A. (2021). The adaptation of The Instagram Addiction Scale (TIAS) into Turkish: Validity and reliability studies. *The Turkish Online Journal of Educational Technology – TOJET*, 20(4), 76-89. Access: http://tojet.net/articles/v20i4/2048.pdf

Türk, A. (2013). Y kuşağı [Y Generation]. İstanbul, Turkey: Kafekültür Publishing.

Yıldırım Becerikli, S. (2013). Kuşaklararası iletişim farklılığı: Bilim teknoloji ve yenilik haberleri üzerinden bir odak grup çalışması [Communication differences between generations: A focus group study through science, technology and innovation news]. *Selçuk İletişim [Journal of Selcuk Communication]*, 8(1), 5–18.

Zemke, R., Raines, C., & Filipczak, B. (2013). Generations at work: Managing the clash of boomers, gen Xers, and gen Yers in the workplace (2nd Ed. b.). USA: Amacom.

# Getting Students Engaged in On-Line Learning

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## ABSTRACT
This paper deals with a course of mathematics at an university in the Czech Republic. This course is for incoming students. It prepares students for math entrance exams. During the coronavirus pandemic period (2020 - 2021) we taught the course online. We had to solve the problem with communication with students and obtain feedback from them. For this reason, we used interactive quizzes. In this article, we compare the situation at other universities, and we introduce online quizzes. Further, we compare their success rate during the course. In addition, we present the results from the student´s course evaluation survey.
**Keywords:** mathematics, quiz, entrance exam, feedback

## INTRODUCTION
There are every year preparing courses for entrance exams at Prague University of Economics and Business (PUEB). Our Department of Mathematics prepare these courses for the mathematics part of exams. Passing these courses increase the possibility of success of students during the entrance exams. All students who want study at PUEB have to pass the entrance exams from Mathematics and other subjects depending on their field of study. Students with excellent school results do not have to pass entrance exams at some faculties of PUEB.

During the study at PUEB, all students have to pass an exam from Mathematics for Economists or Mathematics for Informatics. Thus, importance of entrance exams is justifiable. These courses of Mathematics contain linear algebra and mathematical analysis, as you can see in the syllabus:
- propositional and predicate logic,
- matrix algebra, rank of a matrix, determinants, systems of linear equations,
- limits and their basic properties,
- derivative of the function of 1 and 2 variables and their applications,
- integral calculus of one variable,
- differential equations.

These topics play an important role in economics applications. The contents and examples of final exam can be seen in textbooks Klůfa (2019), Otavová and Sýkorová (2020). In addition, Klůfa (2017) compared the results of students during the entrance exams depending on the type of the faculty and Klůfa (2020) discuss the change in the number of questions which was made during last years.

We teach these courses for many years, but this year was the big challenge for us, since the on-line teaching period started. In 2020/2021 we taught whole the academic year online and these preparing courses were online as well. During the lock down as in many other schools, see for example Barry et al. (2020), Pal et al. (2020), was possible to use for teaching the platform MS Teams or Zoom. MS Teams was used at some schools before the pandemic period, but it was not so often, for example Martin et al. (2019). Glivická (2020) described how the transition to online teaching at PUEB was made and the process and problems connected with online teaching. The biggest problem for teachers were the lack of the necessary hardware and no previous experiences with online teaching. In addition, teachers had only very short time to convert all their materials in online form. On the other hand, students had to face learning individually and took responsibility and learned on their own without supervision.
In addition, in Glivická (2019), there are responses of students of our university about the on-line learning and other studying materials and they show that although the majority of students would welcome other study resources then textbooks and use video tutorials during their self-study time, most of them are not familiar with such platforms and projects as edX, Coursera, Khan Academy, or Wolfram Alpha.

There are many articles which compare and describe the problems with the online teaching. We can mention some research from other countries. For example, in Dhawan (2020), they discussed this situation in India together with deprivation due to social class, ethnicity, etc. This topic was important in the Czech Republic as well, because not every family had at home enough computers or some additional equipment such as camera, microphone, tablet.

Bozkurt et al. (2020) claimed that students would not remember the educational content delivered but how they felt during this period. On the other hand, Ananga et al. (2017) mentioned, already before the pandemic period, that the learning online required varying of pedagogy and practice to ensure effective learning outcomes. Equally, we tried not only to teach, but to involve the students and to avoid that they get bored.

The aim of this article is to compare results of students during the courses and to compare which topic was the most problematic for them.

## THE ORGANIZATION OF THE COURSE

The courses at PUEB take 52, 40 or 32 hours. Long-term courses start during November or December. Short-term courses start in January or February. For students, who live far from Prague, the courses are taught on Saturday, too.

The last academic year was influenced by COVID-19 pandemic and classic face-to-face teaching was converted into online teaching. In this article, we deal with the entrance exam course which takes 40 hours. it started in November 2020 and finished in April 2021. This course was taught in on-line form. It was divided into 20 weeks and every week there was one lesson which takes 2 academic hours. There were 52 students enrolled in the course.

The course included the following topics:
- expressions processing,
- linear and quadratic equations and inequalities,
- systems of linear equations,
- arithmetic and geometric sequences,
- exponential and logarithmic functions, equations and inequalities,
- trigonometric functions and equations,
- complex numbers,
- combinatorics,
- analytical geometry,
- word problems.

The courses were taught on-line all the time. We used the platform Zoom. Students were following how the teacher solved some examples and then they have the possibility and time to solve some examples themselves.
The problem was with the lack of personal contact when teacher wanted to know if students had understood the topic. Some students did not have problem to ask during a lecture, but many of them did not ask. Thus, we had to use some interactive tools to find out if students understood. We chose interactive quizzes.
At the end of every lecture, we did an interactive quiz. It contained five problems from the discussed topic, and it had a time limit.

We used online interactive real-time voting software Mentimeter to create these tests. Mentimeter is an easy-to-use presentation software from a Swedish company. It is used to create presentations with real-time feedback. We built interactive presentations with the online editor. We added questions, polls, quizzes, slides, images and more to create fun and engaging presentations. The audience used their smartphones or computers to connect to the presentation where they can answer questions. The teacher was able to visualize their responses in real-time to create an interactive experience. It helped to break the ice. We encouraged the students to pass these tests and then to speak about the problems they had had. On the other hand, they were able to see the comparing with other students and if they could be satisfied with their knowledge.
Quizzes obtain problems with open-ended and closed-ended questions. To answer an open-ended question, students had to write a number. And to answer a closed-ended question, students had to choose from a distinct set of pre-defined responses. Picture 1 is an example of close-ended question.
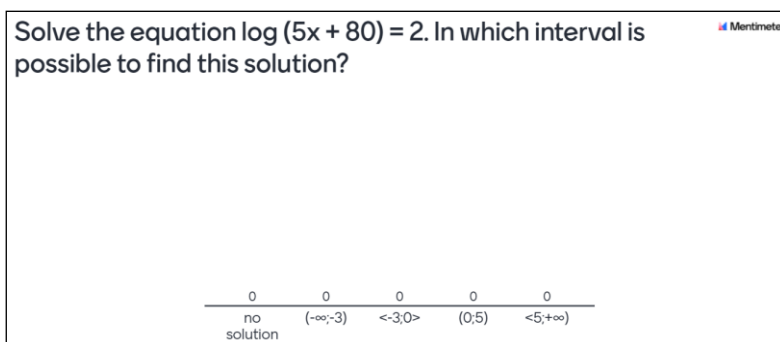
**Picture 1**: The closed-ended question.

When all students had answered or the time limit had ended, then the teacher as well as students saw the right answer and number of answers for all possibilities, see Picture 2.
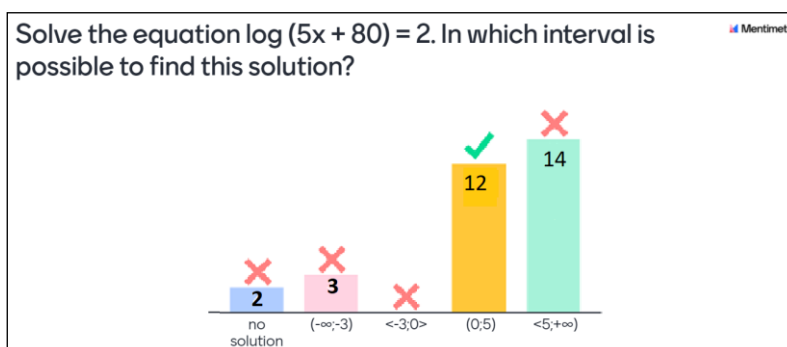


**Picture 2**: **Answers** of students.

At the end of the quiz, we saw the leaderboard. And the winner was the one who had calculated the fastest and with the less mistakes. Students could use nicknames, so the evaluation was anonymous. On the teacher´s screen it could be seen only first 10 persons, see Picture 3. The other students saw their ranking only on their mobile phone.
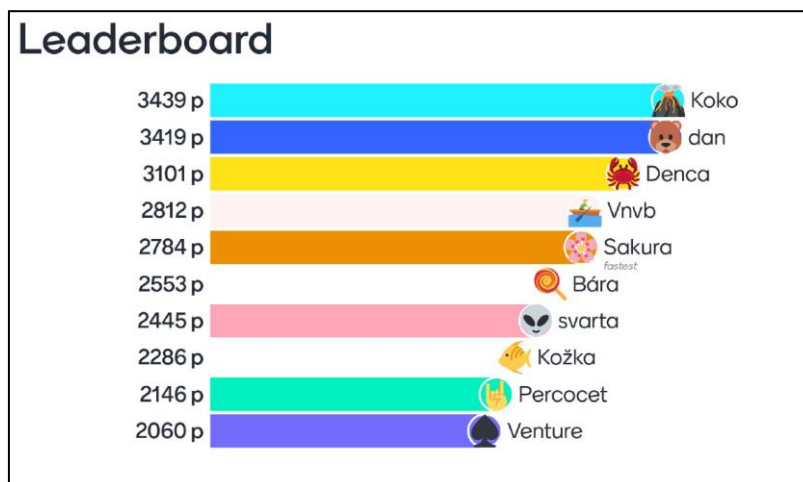


**Picture 3**: Leaderboard.

**EVALUATION OF QUIZZES**
Students fulfilled ten quizzes during the course. The success rate of each question (it means how many percent of students wrote the right answer) and the weighted average success rate of all tests is shown in Table 1.

**Table 1**: The success rate of quizzes.

| Topic | success rate of each question | | | | | weighted average success rate of the test |
|---|---|---|---|---|---|---|
| | question nr. 1 | question nr. 2 | question nr. 3 | question nr. 4 | question nr. 5 | |
| expressions processing | 13% | 43% | 40% | 74% | 50% | 43% |
| linear and quadratic equations and inequalities | 55% | 73% | 48% | 38% | - | 54% |
| systems of linear equations | 33% | 7% | 36% | 57% | 50% | 36% |
| exponential equations and inequalities | 44% | 59% | 31% | 38% | 60% | 47% |
| logarithmic equations and inequalities | 23% | 66% | 39% | 46% | 37% | 42% |
| sequences | 10% | 6% | 50% | 30% | 50% | 32% |
| trigonometric equations | 32% | 25% | 20% | 9% | 29% | 23% |
| complex numbers | 36% | 46% | 23% | 92% | 25% | 45% |
| combinatorics | 68% | 12% | 65% | 21% | 20% | 39% |
| analytical geometry | 27% | 38% | 33% | 31% | 50% | 36% |

Since that only few students asked during the classes when something was not clear, thanks to these tests the teacher found out what kind of examples were not clear for students and when they made the majority of mistakes. The success rate in all tests is not very high, but it is caused by the time limit as well. Some students were more stressed to calculate with the time limit. In addition, some errors were made as typing errors and if a student answered once, it was not possible to change the answer.

The lower success rate had open-ended questions. On the other hand, students were more successful in selecting the right answer from five possibilities. In the entrance exams, there are only closed-ended questions with five possible answers.

Students always obtained by e-mail the right detailed solution of these tests exactly after the class. And the teacher paid attention to the examples, which were the most problematic problems, next class.

If we compare the quizzes, then the highest success rate had the quiz about the linear and quadratic equations and inequations and then the quiz about exponential equations and inequations, and complex numbers. The lowest success rate was in quizzes about trigonometric equations and sequences. The topic trigonometric equations is always one of the most complicated at secondary schools. For example, you can see in Picture 4, questions from the sequences´ quiz.

1) Find $a_2$ in the following sequence:

$$a_{n+1} = a_n - 0.5a_{n-1}$$

$$a_4 = 6, a_5 = 2$$

2) The sides of right-angled triangle are the first three terms of arithmetic sequence. The hypotenuse is 30 cm. What is the sum of the two others side?

3) Find the first term and a geometric quotient in the following geometric sequence:

$$a_3 + a_4 + a_7 = 5, \qquad a_4 + a_5 + a_8 = 15$$

4) Put two numbers between roots of the equation $x^2 + 5x - 14 = 0$ so that they create together with these roots first four terms of arithmetic sequence. What is the sum of these two numbers?

5) Find the sum of the first five terms of the geometric sequence such that:

$$a_1 = \frac{1}{8}, \quad a_4 = 1$$

**Picture 4**: The **sequences** quiz.

The answers of questions 1, 2 and 4 was the number and questions 3 and 5 were closed-ended questions. The answers of students you can see below (Picture 5 - 9). The closed-ended questions had the higher success rate than the open-ended. The biggest problem for students was the second question, where only one student knew the right answer, an in the first question only two students. The reason was that for students is hard to understand to a recurrent sequence (problem 1) and to apply, in addition, Pythagorean theorem (problem 2).



**Picture 5**: Answer to the first question.



**Picture 6**: Answer to the second question.
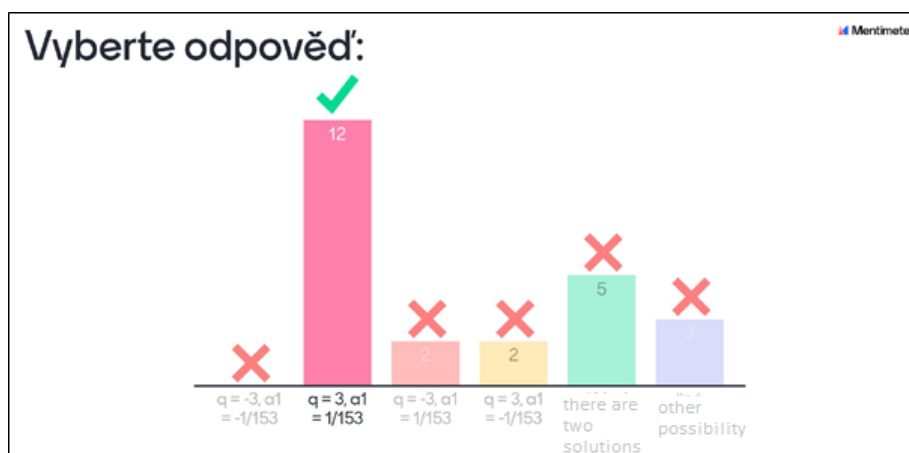
**Picture 7**: Answer to the third question.



**Picture 8**: Answer to the fourth question.
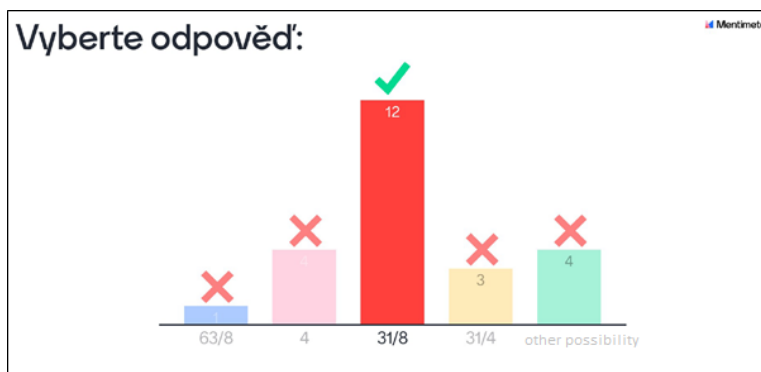


**Picture 9**: Answer to the fifth question.

Thanks to feedback from these quizzes the teacher could go back to the problems which were not clear for students. After other practicing students wrote again new quizzes of these topics. The new quiz about goniometric equations has the success rate 47 % and the sequences´ quiz has the success rate 50 %.

**EVALUATION OF THE COURSE**
Students fulfilled the questionnaire after passing the course. The rate of return was not high. We obtained responses from 26 students from the total 52. The majority of students (22 from 26) who fulfilled the questionnaire were students who missed maximum 3 classes. The average absence of students was 6 from 20 classes. 32 students have less than 6 absences. Some students attended only few classes because they wanted to study only some topics or since they do not prefer this online form.

Half of the students answered they preferred the on-line course than classis learning at school. The other half of students answered that they cannot focus on the topic only by watching.

Twenty students were admitted to university. The half of them passed the entrance exams and the second half had

the excellent results on the secondary school, thus did not have to pass the exams on some faculties. Many of students attended the course to get prepared not only at the entrance exams but to prepare for secondary school-leaving exam.

Students who passed the exams (19 persons) claimed that there were problems which they learnt during the course. The biggest problem was for all of them the word problems. Then students mentioned they had problems with geometric equations, combinatorics, analytic geometry, exponential and logarithmic equations.

Students evaluated positively all the course and the quizzes. They found it very useful to calculate with the time interval and to see their ranking between other students.

## PREPARING COURSES AT OTHER CZECH UNIVERSITIES
We do not take it for granted that university provided these courses. There are only few universities in the Czech Republic, where it is possible. Some courses are free of charge, some are paid. Courses at PUEB are long-term, they take two and more months and they are paid.

For example, at the College of Polytechnics Jihlava (CPJ) they provide these courses for free and they are short-term, usually they take less than one month. Courses at CPJ are for the incoming students, but not to prepare for the entrance exams. The majority of students of study programs at CPJ are accepted without entrance exams. This causes a problem, that many students do not have the necessary level of knowledge and therefore they are obliged to pass a test at the first lesson of Mathematics. Students who did not pass this test with the score more than 50% cannot study the subject Mathematics and repeat it next semester. Thus, these courses at CPJ are for students who are not sure about their knowledge from a secondary school and who want to prepare for this first test. The results of these courses at CPJ can be seen in Dvořáková a Kotoučková (2019). In Pasáčková (2019, 2021) these courses are evaluated as well as their impact on results of students in Mathematics.

At another Czech university, Masaryk University, they have the same procedure as at CPJ. Students are obliged to pass an "Entrance test to Mathematics" and after that they can study the subject Mathematics.

Entrance exams at PUEB have the form of test. Students can choose one answer from five possibilities. The test have 15 problems and contains the basic topics from the secondary school. Students are not obliged to use a calculator nor mathematics table. But they have a list with the elementary formulas. The example of entrance exams can be found in Klůfa (2022). It is observed the complexity of entrance exams every year and the evaluation of these tests can be seen, for example in Klůfa (2017), Otavová et al. (2016).

## CONCLUSIONS
The preparing courses are for students very beneficial, the proof of it is the very high interest of these courses. In this academic year (2021/2022) we offer on-line courses as well as classic courses at university. There is very high demand on on-line courses between students from the remotely placed places from Prague. Thus, we do not have now courses at university on Saturday for these students, but we have only on-line courses during the weekdays. The interactive quizzes are very helpful for teachers as well as students to find out if students understand the topic. Many students after seeing that they are not the only one who do not understand, they do not feel shame and ask and explain what the problem for them in the exercise was.

Now, we applied the new experiences with on-line teaching, not only in these courses but during the classic teaching hours as well. We use the on-line quizzes during the classes to find out if students really understand the topic and if they remember the important parts of the lesson.

## REFERENCES
Ananga, P., Biney, I. (2017). Comparing face-to-face and online teaching and learning in higher education, MIER Journal of Educational Studies, Trends and Practices. vol. 7, pp. 165 - 179.

Bozkurt A., Sharma, R. C. (2020). Emergency remote teaching in a time of global crisis due to Corona Virus pandemic, Asian Journal of Distance Education, vol. 15, no. 1, pp. i–iv.

Dhawan, S. (2020). Online learning: A panacea in the time of COVID-19 crisis, Journal of Educational Technology Systems, vol. 49, no. 1, pp. 5-22.

Dvořáková S., Kotoučková H. (2019). Evaluation of the equalizing course of mathematics at VŠPJ during 2012 - 2018, In Proceedings of 18th Conference on Applied Mathematics, Bratislava.

Barry, D. M., Kanematsu, H. (2020). Teaching during the COVID-19 Pandemic, Eric.

Glivická, J. (2020). Comparison of higher education in quantum computing across Europe with special emphasis on the Czech Republic, 12th International Conference on Education and New Learning Technologies.

Spain: IATED Academy, pp. 3922-3926.

Glivická, J. (2019). New and Emerging Study Resources as Enrichment and Replacement of Traditional Scheme of Introductory Mathematical Courses in Higher Education. The Turkish Online Journal of Educational Technology, vol. 2, pp. 232 – 238.

Klůfa, J. (2022). Matematika k přijímacím zkouškám na bakalářské studium VŠE, Ekopress, Praha.

Klůfa, J. (2020). Probability aspects of entrance exams at university. Mathematics and Statistics, vol. 8, no. 2, DOI: 10.13189/ms.2020.080210, pp. 142 - 152.

Klůfa, J. (2019). Matematika pro bakalářské studium na VŠE, Ekopress, Praha

Klůfa, J. (2017). Homogeneity of the Test Variants in Entrance Exams. 21st International Conference on Circuits, Systems, Communications and Computers, DOI: 10.1051/matecconf/20171250, pp. 1-4.

Klůfa, J. (2017). Some remarks on the difficulty of test variants in admission process, Efficiency and Responsibility in Education (ERIE), Prague: Czech university of Life Sciences Prague, pp. 161 - 167.

Martin, L., Tapp, D. (2019). Teaching with Teams: An introduction to teaching an undergraduate law module using Microsoft Teams, Innovative Practice in Higher Education.

Otavová, M., Sýkorová, I. (2016). Differences in results obtained by students of different faculties, Journal on Efficiency and Responsibility in Education and Science, vol. 9, no. 1, DOI: 10.7160/eriesj.2016.090101, pp. 1-6.

Otavová, M., Sýkorová, I. (2020). Matematika - Soubor testů pro všechny kurzy matematiky na VŠE, Ekopress, Praha.

Pal, D.,Vanijja, V., Patra S. (2020). Online Learning During COVID-19: Students' Perception of Multimedia Quality, 11th International Conference on Advances in Information Technology, DOI:10.1145/3406601.3406632.

Pasáčková, J. (2019). Analysis of students of the study programme travel and tourism and their matematial skills, In Proceedings of 18th Conference on Applied Mathematics, Bratislava.

Pasáčková, J. (2021). Analysis of student mathematical skills, Logos Polytechnikos, Jihlava, pp. 5-17.

# Investigation of the Relationship Between the Attitudes of Physical Education and Sports Teacher Candidates towards E-Learning in Sports and Academic Success in the Distance Education Process

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**ABSTRACT**
The aim of this research is to examine the relationship between the attitudes of university students receiving sports education towards e-learning in sports and academic success. The research group consisted of 227 (89 female, 138 male) volunteer students studying at the School of Physical Education and Sports of Bitlis Eren University with the hybrid (blended) learning method. As a data collection tool The "Personal Information Form" and the "Attitude Scale Towards E-Learning in Sports" form, which determines students' attitudes towards e-learning, were used. Analysis of the data was analyzed using SPSS statistical package program. Significance was accepted as $p<0.05$. It has been determined that 37.9% of the participants of the research group prefer e-learning, 32.6% face-to-face, and 29.5% prefer blended learning. While it was determined that the majority of the research group had good or very good e-learning success for theoretical courses, the majority of the participants were determined to have low and medium e-learning success for practical courses. In addition, it is seen that 52% of the participants prefer visual, 26.9% tactile and 21.1% auditory learning. It was determined that there was no statistically significant difference between the gender variable of the research group and the attitude scale towards e-learning in sports ($p>0.05$). While it was determined that there was a statistically significant difference between the students' preferred learning method, theoretical and practical courses, and the e-learning total score average in sports ($p<0.05$), the type of sports practiced, the perceived income level and type of learning and the type of learning in sports. It was determined that there was no statistically significant difference between the e-learning total score averages ($p>0.05$). In addition, according to the results of the correlation analysis; It has been determined that there is a statistically significant low level positive correlation between e-learning in sports and academic achievement. As a result; It has been seen that the hybrid teaching method applied in the distance education process has a positive effect on the academic achievement of the students.
**Keywords:** e-learning, student, academic success

**INTRODUCTION**
Along with the developments in technology, there are also developments in the field of education. It is seen that distance education, which is shown as an alternative to traditional education, has a complementary nature and shows very successful results. In this process, there has been a rapid transition from printed sources to electronic sources in teaching activities. Therefore, the e-learning process cannot be considered separately from the distance education process (Gulbahar, 2021).

As a result of technology and information age, the need to obtain more information and to produce information is increasing over time. In our age, the production of knowledge and its rapid and perfect dissemination are provided by education and technological components. In line with technological developments, the demand for education has increased and the e-learning system has become more widespread, increasing the reasons for preference (Bach et al, 2006).

The rapid spread and fatality of the New Coronavirus (COVID-19) disease, which started the distance education process, has affected the field of education as well as the social, health and economic areas of life. The increase in the size of the virus and the increase in its deadly danger made it necessary to take precautions in education, made it necessary for many teachers and students to take a break from higher education, and a transition from formal education to distance education was made (Zhang et al. 2020). During distance education with the novel Coronavirus (COVID-19) disease, changes in technology have also been reflected in the teaching materials of educators, increasing diversity and providing many new and creative ways to use the rapid changes that occur

effectively.

Changes and developments in technology have also been reflected in the field of physical education and sports and have created diversity for the application area with a narrow usage area (Mutlu Bozkurt, 2021). Thus, a new aspect and a new dimension have been added to the latest developments in sports games, with motion-sensitive video games in which sportive movements are included in physical activity activities, technological devices that monitor body movement or reaction, called active games or exergaming (Thompson, 2008). However, thanks to technology, access to information can be facilitated (National Association for Sport and Physical Education, 2007) and it has been tried to support the academic success of students with the e-learning environment in sports.

It is used to explore the abilities of students such as the diversity of the learning environment with e-learning, the ability to learn appropriately (individual differences) and unlimited repetition opportunities, and the ability to enjoy healthy mental, physical and emotional activity. In line with this information, it is aimed to determine the effect on some variables by examining the relationship between the attitudes of university students who receive sports education towards e-learning in sports and their academic success.

**METHOD**
The research group consisted of 227 (89 female, 138 male) volunteer students with an average age of 23.25±4.24 who were educated in Bitlis Eren University School of Physical Education and Sports in the 2021-2022 academic year with the hybrid learning method. While the scale was preferred as the data collection tool, descriptive survey method was used to determine "Attitudes towards E-Learning in Sports and Academic Achievement Levels". The scale used in the research consists of two parts, in the first part the "Personal Information Form" containing the demographic information of the students, in the second part; The "Attitude Scale Towards E-Learning in Sports" developed by Mutlu Bozkurt and Tamer (2020) was used to determine the academic success of students with e-learning in sports.

**"Attitude Scale Towards E-Learning in Sports"**
Ranking and score limits of a five-point Likert-type questionnaire;
  Rating:
Strongly Disagree: 1.00–1.79,
Disagree: 1.80–2.59,
I'm Between Two: 2.60–3.39,
Agree: 3.40–4.19,
Strongly Agree: 4.20–5.00
Point limits:
0–29 Very inadequate,
30–49 Insufficient
50–69 Medium
70–89-Good
It was rated as "90–100 Very Good".

The validity and reliability study of the scale was carried out by the researchers, and the KMO (Kaiser-Meyer-Olkin Measure of Sampling Adequacy) value was determined as .937, Bartlett Test 2051,413 and (Cronbach Alpha) α= 0.92.

**Analysis of Data**
The data were analyzed using the SPSS statistical program. The demographic information of the research group, their attitudes towards e-learning in sports and their academic achievement levels are summarized as descriptive statistics with percentage, frequency, arithmetic mean and standard deviation statistics. After it was determined that the data showed normal distribution, Independent Samples t and One-Way ANOVA tests were applied for in-group comparisons. Correlation analysis was used to determine the direction of the relationship between the variables, and regression analysis was conducted to determine the effect of the attitude towards e-learning in sports on academic achievement. Significance was accepted as $p < 0.05$.

**FINDINGS**

**Table 1.** Demographic Information of the Research Group

| | | Frequency | Percent (%) |
|---|---|---|---|
| Gender | Female | 89 | 39,2 |
| | Male | 138 | 60,8 |
| Type of Sport Done | Team sports | 76 | 33,5 |
| | Individual sports | 93 | 41 |
| | Both of them | 58 | 25,6 |
| Perceived Income Level | Low | 61 | 26,9 |
| | Middle | 108 | 47,6 |
| | Good | 58 | 25,6 |
| Preferred Learning Method | e-learning | 86 | 37,9 |
| | Face to face | 74 | 32,6 |
| | Blended | 67 | 29,5 |
| E-learning for theoretical lessons | Low | 46 | 20,3 |
| | Middle | 62 | 27,3 |
| | Good | 67 | 29,5 |
| | Very good | 52 | 22,9 |
| E-learning for app builds | Low | 108 | 47,6 |
| | Middle | 41 | 18,1 |
| | Good | 47 | 20,7 |
| | Very good | 31 | 13,7 |
| Learning type | Tactile | 61 | 26,9 |
| | Image | 118 | 52 |
| | İşitsel | 48 | 21,1 |

When Table 1 is examined, the research group; 39.2% were women, 60.8% were men, 41% were individual sports and 33.5% were team sports, 47.6% were moderate, 26.9% were low. and 25.6% of them have a good income level. It has been determined that 37.9% of the participants prefer e-learning, 32.6% face-to-face, and 29.5% prefer blended learning. While it was determined that the majority of the research group had good or very good e-learning success for theoretical courses, the majority of the participants were determined to have low and medium e-learning success for practical courses. In addition, it is seen that 52% of the participants prefer visual, 26.9% tactile and 21.1% auditory learning.

**Table 2.** T-Test Analysis of the Research Group by Gender Variable

| | | E-Learning in Sports | | t | p |
|---|---|---|---|---|---|
| | | $\overline{X}$ | Ss | | |
| **Gender** | Female | 35,71 | 13,03 | ,378 | 0,70 |
| | Male | 35,04 | 12,79 | | |

p<0,05

When Table 2 was evaluated, it was determined that there was no statistically significant difference between the gender variable of the research group and the attitude scale towards e-learning in sports (p>0.05).

**Table 3.** Analysis of Variance by Demographic Information of the Research Group

| Variable | | E-Learning in Sports | | F | Sig |
|---|---|---|---|---|---|
| | | $\overline{X}$ | Ss | | |
| **Type of Sport Done** | Team sports | 33,39 | 14,04 | 1,478 | 0,23 |
| | Individual sports | 36,29 | 12,94 | | |
| | Both of them | 36,79 | 11,08 | | |
| **Perceived Income Level** | Low | 35,29 | 15,27 | 2,402 | 0,09 |
| | Middle | 33,90 | 11,73 | | |
| | Good | 38,48 | 11,99 | | |
| **Preferred Learning Method** | E-learning | 35,03 | 13,50 | 4,560 | 0,01* |
| | Face to face | 32,64 | 12,03 | | |
| | Blended | 39,07 | 12,41 | | |
| **E-Learning for Theoretical Courses** | Low | 26,84 | 12,08 | 16,634 | 0,00* |
| | Middle | 32,35 | 10,09 | | |
| | Good | 40,34 | 10,09 | | |
| | Very good | 40,44 | 14,89 | | |
| **E-Learning for Application Courses** | Low | 31,19 | 11,48 | 8,697 | 0,00* |
| | Middle | 38,17 | 10,80 | | |
| | Good | 41,00 | 13,14 | | |
| | Very good | 38,25 | 15,32 | | |
| **Learning Type** | Tactile | 34,22 | 12,82 | ,837 | 0,43 |
| | Image | 35,27 | 13,55 | | |
| | Auditory | 37,41 | 11,37 | | |

p<0,05

When Table 3 is evaluated, it is determined that there is a statistically significant difference between the preferred learning method of the research group, e-learning success for theoretical and practical courses and the total score average of e-learning in sports (p<0.05). It was determined that there was no statistically significant difference between learning type and e-learning in sports total score average (p>0.05).

**Table 4.** Pearson Correlation Analysis between Research Group's Attitudes towards E-Learning in Sports and Academic Achievement

| | | Academic success |
|---|---|---|
| **In sports e-learning** | **r** | ,137* |
| | **p** | 0,03 |
| | **N** | 227 |

p<0,05*

When Table 4 is evaluated, according to the results of the correlation analysis; It was determined that there was a low level of statistically significant relationship in the positive direction. These results can be interpreted that as individuals' attitudes towards e-learning in sports increase, their academic achievement levels will also increase. r = .137, p<0.05.

**Table 5.** Regression Analysis for the Prediction of Attitudes and Academic Achievement Levels towards E-Learning in Sports

| Independent Variable | Dependent Variable | B | Std. Error | β | t | p | R | $R^2$ | F | *P* |
|---|---|---|---|---|---|---|---|---|---|---|
| **In sports e-learning** | **Academic success** | 3,202 | ,183 | ,137 | 17,480 | 0,00 | ,137 | ,019 | 4,325 | *0,01* |

When Table 5 is examined, when the results of the regression analysis are examined, it has been determined that the attitude score towards e-learning in sports significantly predicts the level of academic achievement. However, it is seen that the e-learning attitude score in sports explains 2% of the variance (R=137; R2=.019).

**CONCLUSIONS**

In this study, it is aimed to examine the relationship between the attitudes of physical education and sports teacher candidates towards e-learning in sports and academic success in the distance education process. In the 2021-2022 academic year, 227 (89 female, 138 male) students with an average age of 23.25±4.24, who were educated with the hybrid learning method in Bitlis Eren University School of Physical Education and Sports, type of sport, perceived income. level, preferred teaching method, academic success level in theoretical and applied courses and learning type variables.

As a result of the first analysis and research, it is understood that the academic success of the students in the distance education process does not differ significantly according to age groups, gender, perceived income status and the type of sports (individual and team sports). Similar to this study, Jost, Rude-Parkins and Githens (2012) and Kor et al. (2016) stated in their study that gender and age variables had no effect on academic achievement. Despite this, Amro, Mundy and Kupczynski (2015), Dayıoglu and Turut-Asik (2004); Clavier (2013) and Kupczynski, et al. (2014) found that female students are more successful than male students in higher education. In addition, in the study conducted by Tosun (2016), it was concluded that academic success increases with increasing age. In another study, it was determined that the gender variable had a significant effect on the attitude scores towards distance education (Yenilmez, Balbag, & Turgut, 2017).

Secondly, as a result of the analysis and research, it has been determined that there is a significant difference between the students' attitudes towards e-learning in sports during the distance education process and the preferred learning method variable of their academic success. It is seen that students who prefer the blended (hybrid) learning method are more successful. The fact that students can choose the learning method according to the course content in the distance education process affects their academic success positively. As a result of what Solak and Cakır (2014) did, it was concluded that the students who received education with distance learning were more successful than the students who received face-to-face education, but this success was not at a significant level. In his study, Cetin (2018) examined the attitudes of maritime high school students towards e-learning and it was determined that there was a significant difference between the learning method and the attitude towards e-learning. Contrary to the research findings, as a learning method, the highest score was stated as e-learning method, and the lowest score was stated as blended education method. Similar results were obtained in studies parallel to this study by Haznedar and Baran (2012) and Aga, İngec and Sahingoz (2014), Simsek, İskenderoğlu and İskenderoglu (2010).

Finally, as a result of the analysis and research, the e-learning success levels of the students in the theoretical and applied courses in the distance education process were found to be statistically significant. In the distance education process, e-learning and academic success levels in sports were found to be very good for both course content. In other words, it can be said that the academic success of the students in the theoretical and practical courses in the e-learning environment is high. In the distance education process, Siron, Wibowo & Narmatya (2020) investigated the effect of the psychological effects of the pandemic on students' e-Learning attitudes in Indonesia, and it is stated that the ease of using e-learning and theoretically increasing the student's experience as well as their success. Unlike the results of the research, no significance was found in the comparisons of Faisal et al. (2020) on education, engineering, health, technology faculties and Wang & Zhao (2020) on art and other faculty students (p>,05). When evaluating these results, it is thought that the strengths or weaknesses of the e-learning systems used by the students in the distance education process, the distribution in the number of theoretical or applied courses in their curriculum may be effective and create different results.

As a conclusion; According to the results of the correlation analysis between the attitudes towards e-learning in sports and academic achievement levels; It was determined that there was a low level of statistically significant relationship in the positive direction. These results can be interpreted that as individuals' attitudes towards e-learning in sports increase, their academic achievement levels will also increase. As a result of the study conducted by Etlioglu and Tekin (2020), it was determined that there is a significant relationship between students' attitudes towards e-learning and academic success, and this result supports the research findings. Mohamed and Waheed (2011) stated that when the components of attitudes as cognitive, emotional and behavioral information are positive, there is a significant increase in students' performance and academic success in the learning process. Tekinarslan (2008) reached similar results in his study with 804 students and stated that the higher the grade point average, the higher their attitudes towards e-learning. Mutlu Bozkurt (2021) found a significant difference between the attitudes towards e-learning in sports and academic success of students studying at the faculty of sports sciences, and it is stated that there is a strong relationship between students' attitudes and academic success.

**REFERENCES**
Ağa, S., İngeç, Ş. K. & Şahingöz, M. (2014). Meslek lisesi öğrencilerinin e-öğrenmeye yönelik tutumlarının farklı değişkenlerden açısından incelenmesi. Research in Education and Teaching, 3(4), 2146-9499.
Amro, H. J., Mundy, M. A. & Kupczynski, L. (2015). The effects of age and gender on student achievement in face-to face and online college algebra classes. Research in Higher Education Journal, 27, 1-22.
Bach, S., Haynes, P., & Smith, J. L. (2006). Online learning and teaching in higher education. McGraw-Hill Education (UK).
Clavier, C. W., 2013. Academic Performance of First-Year Students at a College of Pharmacy in East Tennessee: Models for Prediction, Tennessee: Copyright ProQuest, UMI Dissertations Publishing.
Çetin, U. (2018). Denizcilik lisesi öğrencilerinin e-öğrenmeye yönelik tutumlarının farklı değişkenler açısından incelenmesi. Yüksek Lisans Tezi, Bahçeşehir Üniversitesi Eğitim Bilimleri Enstitüsü, İstanbul
Dayıoğlu, M. & Türüt-Aşık, S., 2004. Gender Differences in Academic Performance in a Large Public University in Turkey. Economic Research Center, pp. 1-35.
Etlioğlu, M., & Tekin, M. (2020). Elektronik öğrenmede öğrenci tutum ve akademik başarı arasındaki ilişkide öğrenci merak ve kaygısının aracılık rolü. Selçuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, (43), 34-48.
Faisal, R. A., Jobe, M. C., Ahmed, O., and Sharker, T. (2020) Mental Health Status, Anxiety and Depression Levels of Bangladeshi University Students During the COVID-19 Pandemic. International Journal of Mental Health and Addiction, DOI : https://doi.org/10.1007/s11469- 020-00458-y
Gülbahar, Y. (2021). E-öğrenme. Pegem Akademi Yayıncılık. 6. Baskı, Ankara.
Haznedar, Ö. & Baran, B. (2012). Eğitim fakültesi öğrencileri için e-öğrenmeye yönelik genel bir tutum ölçeği geliştirme çalışması. Eğitim Teknolojisi Kuram ve Uygulama, 2(2), 42-59.
Jost, B., Rude-Parkins, C., & Githens, P. R. (2012). Academic performance, age, gender, and ethnicity in online courses delivered by two-year colleges. Community College Journal of Research and Practice, 36(9), 656-669.
Kör, H., Erbay, H., Demir, E., & Akmeşe, Ö. F. (2016). A study on the factors affecting the academic performance of distance education students and formal students. Hitit University Journal of Social Sciences Institute, 9(2), 1029-1050.
Kupczynski, L., Brown, M., Holland, G. & Uriegas, B., 2014. The Relationship between Gender and Academic Success Online. Journal of Educators Online, 11(1), pp. 1-14.
Mutlu Bozkurt, T. (2021). Spor bilimleri fakültesinde eğitim alan öğrencilerin sporda e-öğrenmeye yönelik tutumları, akademik erteleme davranışları ve duygusal zeka özelliğinin incelenmesi. Doktora Tezi, Gazi Üniversitesi, Eğitim Bilimleri Enstitüsü, Ankara.
National Association for Sport and Physical Education (2007). Initial guidelines for online physical education: A

position paper from the National Association for Sport and Physical Education. Reston, VA: Author.

Sıron, Y., Wıbowo, A., Narmadıtya, B. S. (2020). Factors Affecting the Adaption of E-Learning in Indonesia : Lesson from COVID-19. Journal of Technology and Science Education. 2020 – 10 (2) p.282-295. DOI : https://doi.org/10.3926/jotse.1025

Solak, E., & Cakir, R. (2014). Face to face or e-learning in Turkish EFL context. Turkish Online Journal of Distance Education, 15(3), 37-49.

Şimşek, A., İskenderoğlu, T. & İskenderoğlu, M. (2010). Investigating preservice computer teachers' attitudes towards distance education. Procedia Social and Behavioral Sciences, 9, 324-328.

Tekinarslan, E. (2008). Attitudes of Turkish distance learners toward internet-based learning: an investigation depending on demographical characteristics. Turkish Online Journal of Distance Education-TOJDE, 9(1), 67-84.

Thompson, K. (2008). Word watch. Popular Science, 272(1), 2.

Tosun, M. (2016). Açık öğretim öğrencilerinin akademik başarı düzeylerinin karşılaştırılması [Comparison of open education students' academic achievement levels] (Yayımlanmamış yüksek lisans tezi). İstanbul Üniversitesi, Fen Bilimleri Enstitüsü, İstanbul.

Wang, C. ve Zhao, H. (2020). The Impact of COVID-19 on Anxiety in Chinese University Students. Frontiers in Psychology. DOI : https://doi.org/10.3389/fpsyg.2020.01168.

Yenilmez, K., Balbağ, M. Z., &Turgut, M. (2017). Öğretmen adaylarının uzaktan eğitime yönelik tutumlarının bazı değişkenler açısından incelenmesi [Investigation of prospective teachers' perceptions on distance education with respect to certain variables]. Erzincan Üniversitesi Eğitim Fakültesi Dergisi, 19(2), 91-107. DOI: 10.17556/erziefd.305902.

Zhang, W., Wang, Y., Yang, L., & Wang, C. (2020). Suspending classes without stopping learning: China's education emergency management policy in the COVID-19 outbreak..

# Opinions of Music Teacher Candidates on Determining the Suitability of the Distance Education Model for the Voice Education Course

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**ABSTRACT**
The human voice, which is a natural and unique instrument, has a fundamental importance in expressing ourselves in life, both in communication, in the arts of oral and the art of singing. Therefore, using a person's vocal potential in its best, using the voice in its natural state and preserving vocal health are extremely sensitive and important issues. Therefore, the best realization of the objectives determined in voice training depends on the quality of the trainer and the training process. In the Voice Education course under the Music Teaching Undergraduate Program, one of the goals is to teach the music teacher candidate to use their voice, which is their most basic and natural instrument, in the best ways of speaking and singing, while also teaching about the protection of vocal health and preserving and improving the voice in its natural state. A music teacher candidate who receives such qualified voice education is able to apply what theır learning in their practical life as knowledge and behavior, while using their own voice correctly and setting a good example for their students, they will also train their students well to protect their vocal health. Therefore, adequate and qualified education should be given to music teacher candidates at the level of knowledge and practice in the field of voice education. Due to the Covid 19 pandemic, voice education lessons in the Music Teaching Undergraduate Program have been taught with the distance education model for a while. Unfortunately, it is concluded that voice training lessons based on practice are not suitable for online lessons with distance education. In the light of this view, the purpose of this research is to determine the suitability of the distance education model for the voice education course in the context of the opinions of the music teacher candidates. The results of this research, in which the scanning model and qualitative research method were used, indicate that the distance education model is not suitable for the voice education course, being an applied course.
**Keywords:** Distance education, Model, Voice education, Music, Teacher candidate

## INTRODUCTION

In the context of rapid changes and developments in the field of science and technology, the current age we live in is called the "information age". Knowledge has become the most important tool for development and change today. However, it is important and necessary not only to access information, but also to establish an understanding that prioritizes producing and managing information. Thus, societies could achieve their goals of being endurant and sovereign (Tuncer and Taşpınar, 2008, p.141).

Gültan (2003, p. 47), defines the information society as a society in a network structure where information spreads rapidly on a global scale and accumulates continuously, concepts such as flexibility, creativity and innovation are determinative, educated individuals are at the forefront and interaction is high (As cited in Birkök & Vuranok, 2010, p. 429).

Change is often expressed as the behavior of adapting to the conditions of the day by giving up old understandings and habits. Accordingly, it can be said that change is the process of learning new concepts and techniques compatible with the developing world, adapting them to personal life and reaching a better standard of living. As individuals and institutions are in a constant move to adapt to the environment and to maintain their existence they need to keep up with change. In this context, the field of education, as in all other fields, is one of the fields where changing conditions, developing methods and techniques are most applied (Odabaş, 2003, p. 2).

Education has been defined in different ways according to each philosophical system and psychological approach, and most of these definitions have attributed a purpose to education. According to research, education can be defined as the process of creating desired biochemical changes in the brain as a result of physical stimulation (Sönmez, 2007, p. 5). In general, it is essential that the individual learns by doing and experiencing, in the realization of the educational process, which can also be defined as the process of gaining or changing behavior in a willful and deliberate way, through his own life. In this context, the aim of a qualified education should be to

train individuals at the highest level in a balanced way in terms of cognitive, affective, behavioral and social aspects in line with their interests and abilities.

Tanilli (1989, p. 16) explains the aim of education today as the development of a balanced personality whose innate abilities have been revealed and the person gained new abilities, the person is able to adapt to new situations, and know how to change and correct themselves. The main lines and objectives of education are to make people aware of their place in the world by adding universal cultural values to national cultural values, to enable them to evaluate their past, present and future correctly, to give them the confidence that they can determine their future, and to teach them that they can sustain the forces of nature under their dominion without being suppressed by these forces.

There are the following features on the basis of education (Sönmez, 2005, p. 37):
• Taking human as an object,
• The present condition of the object is considered insufficient,
• Changing the object in the desired direction,
• Adjusting the environment for this purpose; consistent, effective tools, strategies, methods, techniques, etc. activation of stimuli
• Whether the object acquires the desired behaviors (targets) needs to be polled.

Since education constitutes a base for individuals and society, societies aim to raise individuals with the qualifications they need, while individuals try to develop themselves in accordance with the rules of the new world order in order to meet the demand of their societies. This development becomes possible with the countries' restructuring of their education programs (Tuncer and Taşpınar, 2008, p. 126).

In addition to the process defined as globalization in the world since the last quarter of the twentieth century, advances in new communication technologies have led to extensive changes in the field of education. The fact that neo-liberal economic policies, which form the basis of globalization, are being implemented in many countries, is the reason why education systems are deeply affected by the pressures of globalization and there are transformations in education that will meet the requirements of the new era. At this point, the field of higher education has been one of the fields where the effects of these transformations have been directly observed in recent years. Although universities have experienced different transformations throughout its long history, Peter Scott (2002, p. 193) states that no other factor has been able to achieve the transformation that globalization has created on the university since the day it first emerged. According to Scott (2002, p. 198), the university has faced three important problems in the face of globalization. These are the change of the basic role of universities, the emergence of financial difficulties and the changes that communication technologies have created in the universities (Cited by Çelik 2016, p. 119, 120).

The increase of advances in information and communication technologies has led to an increase in the tendency towards technology-based teaching in universities. Technology-assisted teaching is defined; comfortable, self-paced, individualized and interactive, cheaper and faster, flexible in terms of space and time. It is thought that technology increases and expands the learning opportunities of people who do not have the opportunity to access information (Yang & Vidovich, 2002, p. 216).

Toker Gökçe (2008, p. 1) states that the need for renewal required by being a modern society directs individuals who cannot benefit from the education system formally to try the distance education method. Thus, distance education, which provides access to information without time and place limits, and provides independent and flexible learning opportunities in the learning process, has made a significant contribution to the spread of lifelong learning (Bakioğlu & Can, 2014, p. 16; Torkul, 2012, p. 42).

Gülnar (2008, p. 262) defines distance education as an education system in which an effective method is followed in accessing information resources and providing students with these resources, technology is utilized at the highest level, and the learner and the teacher are independent in place and time. As it can be understood from this definition, it is not possible to consider distance education and technology separate from each other. The development in technology seems to be the most important factor in the spread of distance education. However, what is important in distance education is not only advanced technological opportunities, but also increasing the quality by using these technologies in an appropriate and planned way.

Distance learning is also defined as a modern and effective form of learning that can be presented independently of place and time, and includes features such as configuring and updating educational materials appropriately and

flexibly in the electronic environment, integrating different technologies into the learning process and using them 24/7 (Yamamoto and Altun, 2020, p. 30).

Another definition of distance education is that a teaching method carried out from certain centers, aiming at self-learning of the individual, and providing educational content with specially prepared tools and various environments for learners (Banar & Fırat, 2015, p. 18). It is seen that not only university students, but also professional individuals are included in distance education programs. The distance education model can be used for inexperienced teachers at the beginning of their professional lives and for the continuous training of experienced teachers to improve themselves professionally. In this way, it is possible to reach wider masses more economically and in a short time (Banks et all, 2007, p. 13).

In many countries three main reasons for the dissemination of distance education are geographical distance, social imbalance and individual problems (Odabaş, 2003, p. 3). Here distance education can be understood as the interactive exchange of data with advanced technological equipment for all segments of society often far from each other. As a result, distance education can be considered as a modern type of education that offers equal opportunities in education to people who cannot receive formal education due to time, place, age, geographical barrier, financial difficulties, business life, health and family problems (Odabaş, 2003, p. 15).

The main focus of the distance learning model is learning content rather than student-teacher communication. While designing distance education, many variables such as material quality, communication style, and transfer of information to students need to be carefully planned (Tuncer & Taşpınar, 2008, p. 132, 133).

According to Can (2020, p. 41), the planning and coordination of distance education services, the adequacy of the infrastructure of the system, effective management and control are of great importance, as they differ from the management of formal education institutions. In particular, the creation of the infrastructure, the planning of the lessons and the creation of the course content should be handled and maintained with a holistic approach.
With a similar approach, it is not correct to plan educational activities by considering only teachers, students, or the content of a certain subject area. The education system is the organization of certain elements to work in cooperation and to form a whole, in order to achieve certain goals. The education system is like any other system. It consists of "input, process, output and evaluation" elements. Any change, deficiency or misoperation in any of these interacting elements will affect the operation of the system and the quality of the product to be obtained (Tan and Erdogan, 2004, p. 5).

On the other hand, as a result of scientific research, it has been determined that the human organism's ability to adopt innovations is limited in the face of a rapidly changing world. Although a person can adapt to rapid changes, in order to assimilate these changes one needs to be managing in their life while establishing a relationship between new events and their past, which is essential to evaluate the new situation. It has become more difficult for modern people to experience this processing. In the face of rapid changes in the world, the values adopted in one generation in some societies are completely rejected in the next generation. The speed of change does not allow people to distinguish between right and wrong when making decisions, so behaviors often do not go beyond simple reactions to situations encountered in an instant and unexpected way, rather than being future-oriented. In addition, when the human brain is overloaded with information and stimulation, it cannot function properly, and in some cases, even severe and permanent damage may occur (Geçtan, 1992, p. 24, 25). For this reason, this fact should be taken into account in the education of the individual, and what, how, how much and how to give should be considered and applied correctly.

In the current period, due to the pandemic, education has been carried out for a long time with the distance education model. Distance education, which is considered as an important requirement of the modern age, is a result of the contemporary world, showing our ability to adapt to our age and the digital education contents when we consider its content, quality and accessibility. It ensures the continuity of education-teaching activities while eliminating age, time and place limits (Sözen, 2020, p. 1). However the scientific researchers are working to determine the status of distance education compared to traditional education today. Studies have not yet been able to clearly confirm the assumption that distance education has a higher quality than traditional education (Tuncer and Taşpınar, 2008, p. 125).

Since face-to-face education is not a possibility due to the current pandemic, courses in every field and level have been taught with the distance education model for a while in order to continue the education process and for the students to not to be deprived from education. Distance education, which is an education system that has increased its popularity with the development of technology in the 19th and 20th centuries, has come to the agenda again as an option that can completely replace face-to-face education, despite all historical indications that it will be

insufficient on its own (Can and Köroğlu, 2020, p. 370). However, apart from the aim of catching up with the speed of information, a significant superiority of the institutions that provide distance education in all the remaining stages has not been revealed yet over the traditional institutions (Tuncer and Taşpınar, 2008, p.130). In this context, it would be correct to consider the distance education model not as an option against the traditional education system, but as an educational technology that complements the traditional education processes (Uşun, 2006, p. 21).

For the purposes of ensuring social progress and development, as in all areas of education, the needs for knowledge of teachers who will train people should be met with appropriate environments and methods. For a healthy social structure to emerge, teachers' ability to train new generations in line with the needs of modern society depends on their being equipped with necessary, sufficient and up-to-date information. In this context, especially newly graduated young teachers should at least have knowledge about the latest technologies used. It is one of the primary duties of a country to train teachers who have the qualifications to train people who have adapted to the age. One of the most important advantages of developed countries is to have qualified people trained with a modern understanding of education (Gelen, 2008, p. 41; Cited by Birkök and Vuranok, 2010, p. 432).

When the distance education model is compared with the practices in teacher training and transferring information to teachers, it is seen that the practices in Turkey are still in their infant years. Due to reasons such as lack of resources, limited budget, and lack of training of personnel, sufficient studies cannot be currently carried out on this subject in a satisfactory level (Uşun, 2006, p. 273).

When an evaluation about teacher training in the field of music education is made, the teaching profession in general is directly related to speaking and it requires the use of the voice for long periods of time. In the field of music education, instructors have to use their voices more as they both speak and sing while teaching. In this context, music teacher candidates can be equipped to provide an effective voice education service in the future, with a qualified education approach to be offered to them. For this reason, it is of great importance that in addition to basic vocal training techniques and song repertoire, students who are responsible for their education in the future receive adequate training in vocal training methods and techniques, vocal characteristics and protection of vocal health. Thus, the realization of qualified music education through qualified music teachers will enable the training of individuals who love music, have developed aesthetic feelings and are creative.

The general purpose of the "Voice Education" course in the music teaching undergraduate program is to enable the music teacher candidates to use their voices in their natural state and in the best way while preserving their vocal health. However, since it is an individual course that is difficult to understand, individual differences should be taken into account in education, and knowledge and skills should be given to each student in ways that each student can comprehend.

Voice training is the process of acquiring the necessary behaviors for the individual to use his/her voice accurately, beautifully and effectively, with a certain technical and musical sensitivity, in line with artistic and educational purposes in accordance with its anatomical and physiological characteristics (Çevik, 1999, p. 37). This process covers the theoretical foundations and effective experimental practices necessary for the development of the individual's speaking and singing skills.

The human voice, which is basically used as a communication tool in life, is also an aesthetic expression tool in oral arts and music art. Either way, it allows people to express themselves directly and naturally. According to Vennard (1967, p. 165), the human voice, defined by Green (1975, p. 3) as the only unique instrument, is a more romantic instrument than other musical instruments, since it provides direct expression of emotions and belongs to one's own body.

According to Ömür (2001, p. 7), the art of singing is more specific than speaking. However, every person can sing well and develop their voice if they learn to use their voice correctly. The truths for speaking or singing are one, and when they are followed, the risk of health and voice problems will be greatly reduced.

Ware (1999, p. 49), states that voice pedagogy is about helping students to develop their technical skills and musical expressions, both systematically and methodically, but also creatively and flexibly, through the presentation of comprehensive knowledge and complex skills. Therefore, being a good voice trainer requires not only having competent qualifications in vocal techniques, but also acquiring advanced, versatile and advanced teaching methods (As cited in Wei, 2006, p. 27). Cynthia Hoffmann (2003) explains that her role as an educator is to "help young students become artists who can express themselves more freely in terms of musical performance and to support their musical performance and expression skills physically, spiritually and mentally in order to

achieve this" (Cited by Jung, 2010, p. 20). However, it is not possible to realize these approaches and goals in voice education through the distance education model.

In the light of the explanations made so far, it is thought that the voice training courses in the Music Teaching Undergraduate Program are not suitable for live lessons with distance education, especially since they are practical. It is because mental and physical relaxation, correct posture, breathing and vocal exercises, and song performance exercises (rhythm, melody, correct pronunciation of words, correct use of breathing in the right place, nuance studies, etc.) are exercises that should be done face-to-face with the trainer and repeated over and over when necessary. In addition to the many problems experienced in the distance education process, the fact that some students do not have the necessary environment and facilities to conduct remote live lessons prevents them from taking the lessons in an efficient and qualified manner. Students had to study this course as distance learning, one semester (spring) in the 2019-2020 academic year and both semesters (fall and spring) in the 2020-2021 academic year. Based on these reasons stated above and in line with the purpose of this research, it was thought to conduct this study in order to determine the suitability of the distance education model for the voice education lesson by interviewing the students.

## PURPOSE AND IMPORTANCE OF THE RESEARCH

The aim of this research is to determine the suitability of the distance education model for the "Voice Education" course, which is an applied course in which the basis of correct, beautiful and effective speaking and singing is laid in line with the opinions of the music teacher candidates. As far as known, there is no other study in this field that is done in Turkey, which adds to the importance of this research.

## METHOD

In this study, "Scanning Model" and "Qualitative Research Method" were used. Survey models are research approaches that aim to describe a past or present situation as it is. The event, individual or object that is the subject of the research is aimed to be defined in its own conditions and as it is, no effort is made to change or influence it in any way. Although screening models are applied alone in a research, it is not likely to have a research model without screening (Karasar, 2002, p. 77). "Qualitative research is a research in which qualitative data collection methods such as observation, interview and document analysis are used, and a qualitative process is followed to reveal perceptions and events in a natural environment in a realistic and holistic way" (Yıldırım & Şimşek, 2004, p. 35).

## DATA COLLECTION TOOLS

In this study the data were collected through literature review and interview technique. Literature review is the reading and selection of existing information, thoughts, discussions, speculations and findings related to the research area in order to achieve a certain purpose and evaluating them in an effective critical way (Ekiz, 2003, p. 173). For the literature review, it is recommended to scan the literature especially in recent years and to reveal the direction of the trends in the world, and to conduct a comprehensive review in a way to reach both the domestic and foreign literature (Demirel, 1999: 101). In line with this information and the purpose of this research, the domestic and foreign literature on the subject has been tried to be examined.

The interview technique can be done face-to-face, as well as with written questionnaire forms (Demirel, 1999, p. 101). Briggs (1986) argues that the interview is the most common data collection method used in research in the field of social sciences. According to Briggs, the interview method is a very effective method in obtaining information about individuals' experiences, attitudes, opinions, complaints, feelings and beliefs (Cited by Yıldırım & Şimşek, 2004, p.105). The success of the interview largely depends on the selection of an unbiased sample, and this is an important stage and task for the interviewer (Balcı, 2004, p. 161).

In the research, "semi-structured interview form for students" was used. The interview was conducted with a total of 20 students who have been studying at Buca Education Faculty, Fine Arts Education Department, Music Education Department and who have taken voice education lessons. For this purpose, the prepared interview form was evaluated by 4 voice education experts, 2 music education experts and 2 educational science experts, and the number of items was determined as 12 at the end of these evaluations. While preparing the interview questions, care was taken to ensure that they are clear and understandable, written in a plain language, have the quality to serve the purpose in terms of content, and that there is harmony between the questions.

Interview form that is prepared for students includes the categories of "Lesson Duration, General Problems, Problems with the Use of Sound, Learning-Teaching Process, Application in the Professional Field". The interview form, which was pre-tested with 5 people, was applied to a total of 20 students. Interviews with individuals, recorded by voice interviews and by taking notes during interviews were converted into text. The analysis of the

texts was done with the descriptive analysis method. For the validity of the analysis, the records were analyzed by transcription by two different researchers. In order to determine the validity of the data obtained, the data were confirmed by comparing them to the data source. Interview form for students is in Appendix 1.

## DATA ANALYSIS TECHNIQUES
In the research, the questions prepared for the students were divided into categories. After, the answers given for each question were divided into sub clusters according to the frequency of use, and sample sentences related to each category were determined among similar sentences.

## FINDINGS AND COMMENTS
In this study, which was conducted to determine the suitability of the distance education model for the voice education lesson, the following findings were reached when the answers of the music teacher candidates to the interview questions were evaluated:

**Category: Lesson Duration**
Question 1: "Is the voice training you receive during the distance education period sufficient in terms of weekly lesson hours, since the lessons are limited to the designated session hours?" While 10 students gave a negative answer to the question, stating that the time was insufficient, 10 students gave a positive answer and stated that it was sufficient. Overall, students who gave negative answers stated that there were technical problems in attending and continuing the course, and sometimes the course ended before it was completed, as well as the course was insufficient in terms of theory and practice and in terms of content. When the answers of the students who gave positive answers were evaluated it is found that 5 students stated that it was sufficient because they did not have problems with attending and connecting to the course, 5 students stated that it was actually insufficient, but they gave a positive response although online education created more burden than formal education and they had problems focusing. Examples of their sentences:

1st student: "Already, while it is difficult enough to teach online, we also experience problems such as the stress of not having enough time, and the meeting being ended in the middle of the study due to the course time."
Student 7: "It is not enough, because it is only one hour of lecture, and one hour is insufficient in terms of content."
Student 16: "It is not enough, because even in face-to-face education some issues may be missing in a one-hour lesson, but now we are either late or unable to attend the lesson due to connection errors in most lessons. So, an hour a week is very little."
3rd student: "We could find the opportunity to work with our teacher more often in formal education. We could find the opportunity to work more outside of class hours. Now, we do not have such a chance, as we are both seniors and receiving online education. Although more is needed for our education, online education has placed a greater burden on us than formal education. That's why I regretfully say enough."
15th student: "Sound training lessons are sufficient since we don't have any problems with attending and connecting."

**Category: General Issues**
Question 2: "What are the most common problems you encounter in the distance education process?" When the answers given to the question are evaluated, overall the issues were connection problems, problems caused by the devices they use, problems with the online system, audio transmission and communication problems, inability to focus on lessons, decrease in communication with teachers and efficiency of lessons, etc. are noted. Some examples:
2nd student: "There are internet connection problems and sometimes the system freezes, which are the most common problems I encounter. There is also a concentration problem."
5th student: "Connection problems, the decrease in our communication with our instructors and the decrease in the efficiency of the lessons are the most common problems I experience."
17th student: "I have problems with the seldom disconnection from the internet during the education and the sound transmission from the microphone and expressing myself in the lessons. It is not possible to have sincere and comfortable communication as in face-to-face education. Sometimes not seeing our teachers in the lessons disrupts class participation, attention, concentration and motivation."

**Category: Problems Related To Use Of Voice**
Question 3: "What are the most common problems you encounter in voice training courses during the distance education process?"
a) Relating to mental and physical comfort
b) Regarding correct posture
c) Pertaining to diaphragmatic breathing

d) Relating to voice-breath connection and correct sound reproduction
e) Relating to receiving the sound in the resonance region (timbre-vibration)
f) Register related (head voice-chest voice transitions)
g) About rhythm, melody, intonation and articulation
h) Relating to musical singing and interpretation
ı) Apart from these, is there any problem you would like to add, and if so, what is it?

Mental and physical comfort, correct posture and musical singing are most frequent answers to this question. Also, opinions have been expressed about diaphragm breathing and the sound-breath connection, about taking the sound into the resonance region, about the register, about rhythm, melody, intonation and articulation, and some answered choosing all of the above issues. Some students indicate that their lessons were interrupted due to internet interruptions and connection problems during the distance education process, that their voices became mechanized due to the training made by means of technological devices, that they did not hear the naturality in sounds, that they had synchronization problems with the trainer during the exercises and performance, that they had problems in communication and agreement regarding problems related to the use of voice and song performance. They stated that due to distance education, they could not feel the support of the instructor as in face-to-face education and that it was difficult to do voice lessons at home. Some examples:

9th student: "In the face-to-face education model, it is possible for the teacher to intervene immediately during the performance where necessary. This is not very possible in the online lessons. So, in terms of mental and physical comfort, the distance education process can increase our performance anxiety and our level of anxiety during the exam. I find online classes less efficient especially in terms of musical singing and interpretation. That is because it is difficult for the teacher to transfer information to the student and the interaction decreases in the courses held in the distance education model (I believe the problem is due to the distance education model).

10th student: "The fact that the lessons are conducted by distance education often causes communication problems, disagreement and incomprehension in the lessons. It's tiring because I can't convey my performance fully. Unfortunately, this course has become one of the sit-down courses with distance education. I cannot use my body as well as I want because I have to sing while sitting down at the table, normally although I need to sing standing up. I sometimes misuse the diaphragm breathing because my teacher is not with me, so she cannot observe and warn me as efficiently. There are also respiratory problems based on body posture."

Student 16: "First of all, since we have to be in the camera's frame of view, I feel physically like I am in a mould from the very beginning of the lesson. This makes me nervous. Besides, we have to wear headphones and because the cable of the headset is not long, we sing very close distance to the phone and the outgoing image becomes very narrow. Regarding the audio-breath connection and accurate sound reproduction, I have trouble with the earphones in both ears when I can't hear myself fully and I can't focus because I'm distracted. Since the lessons are held in the digital environment, the sound is often different and mechanical to the other party than it actually is. The volume up exercises related to rhythm, melody, intonation and articulation are very difficult, and we cannot go in sync with the exercise or accompaniment played by the teacher. This makes working harder than it already is. There are moments when I sing with earphones and I am out of tune because I can't hear my own voice. In terms of musical singing and interpretation, we usually record the ready accompaniment of every piece we work on and send it to our teacher to listen. The nuances or some of the interpretations we make are not very clear since the devices we record our sound are not high-end recording devices.

17th student: "It is very difficult to do singing lessons at home and it affects all the above items, disrupting our motivation and willingness to work."

**Category: Learning-Teaching Process**
Question 4: "Do you teach the courses with a theoretical or practical focus? How does this affect you?" 3 of the 20 students answered the question as equally weighted, 3 of them more theoretically, 14 of them as practical, with theoretical support when necessary. Some example of their sentences:
1st student: "We learn both equally. We do not have a problem with the efficiency of the lesson while we are studying theoretically, but for the practical part, the lesson is not efficient at all. Even though we do our best with my instructor, our lessons in the distance education process are not as efficient as face-to-face."
9th student: "Theoretical and practical contents are equally distributed. This leads to positive results for me."
10th student: "We are teaching the lessons more based on practice. Since it is a hands-on course, this makes me feel good. When necessary, general theoretical information about the works is given. Being conscious in this way makes me happy."

13th student: "I teach my singing lessons both theoretically and practically. I think it has a positive effect on me. Since I am informed about the works that I am going to sing or have sung, I can interpret the works by understanding them. When there are problems for practical applications in the online environment we work with theoretical descriptions."

17th student: "More theoretical, occasionally applied. Clearly, this is not a positive affect. I prefer it to be both theoretical and practical enough."

Question 5: "Is the voice training you received in the distance education process sufficient in terms of theoretical and practical content?" To this question, 6 out of 20 students stated that it is definitely insufficient, 12 students responded that it is sufficient for the distance education process and 2 of them stated that although it is sufficient when evaluated theoretically and for the distance education process, it is insufficient compared to face-to-face education. Example from their sentences:

7th student: "I do not find this course efficient because it is incompatible with the distance education model and has many shortcomings."

8th student: "I don't find it sufficient for me at all, I can even say that it made me regress."

15th student: "I think that we have processed the necessary information and practices about using the voice correctly in the most efficient way possible for the distance education process."

19th student: "Theoretically, there is no problem in terms of content. Since the course is not face-to-face in practice, there are time limitations, connection problems, etc. Problems occur for these reasons."

Question 6: "Can you easily put the theoretical knowledge you have acquired in the lessons into practice?" While 11 out of 20 students answered the question positively, 9 students stated that they had difficulties in practice due to the lessons not being face-to-face with the instructor, due to the attending the lessons by phone, due to the screen and because they could not see the instructor when they taught the lessons with voice communication without video. Some examples:

Student 1: "Yes. Theoretically, we gain enough hardware, so I have no difficulty in putting it into practice."

4th student: "I can't apply them completely, sometimes I can't be sure of the accuracy because we learn with distance education. If we could learn face-to-face with our voice trainer, I could have implemented it better."

8th student: "It is very difficult to put theoretical knowledge into practice, because we try to take a practical lesson by working one-on-one with the teacher, by imitating what the teacher has exemplified for us. However, it is not possible to do this in distance education, neither the teacher can transfer it to us, nor we can receive it."

Student 16: "Sometimes yes, sometimes no. Although our teacher teaches us some things and then applies it, we can't see it fully. I attend the class on the phone and have difficulties on the small screen. That's why it's getting harder for me to put things into practice."

Question 7: "Do you think that you were trained with songs suitable for your voice characteristics and development process during the distance education process?" To the question, 17 out of 20 people gave a positive opinion and 3 gave a negative opinion. Some responses of the students are as follows:

1st student: "I can neither say yes nor no. We studied with works that are suitable for the characteristics of my voice and my voice limits, yes, but I don't think my voice has improved since we are lacking in practice due to online education."

2nd student: "Yes, I think I am being trained with appropriate work. But I would like it more to work on them with face-to-face education."

7th student: "I started to have more difficulty in the distance education process for the exercises that normally I would not have difficulty of or when I am performing the work."

8th student: "No, I don't think so, because my voice had an incredible decline. We can neither do vocal exercises nor work properly, which drops us behind a lot, and I think that the teachers are uncomfortable with this situation as much as the students."

Question 8: "Do you believe it is necessary to be trained with piano accompaniment? Why? How does it affect you if there is piano accompaniment or not in the lessons?" To the question, all 20 students stated that it is necessary to be trained with piano accompaniment. Benefits of piano accompaniment are that it has been easier learning the songs, its contribution to intonation, it makes them feel more confident, it helps accuracy and musical singing, its increase their respect, interest and motivation for the lesson, its contribution to the development of vocal training, its contribution to seeing, feeling and singing the song as a whole, improving the sense of hearing and creating the harmonic infrastructure. Some excerpts from the responses of the students:

1st student: "Since there is no piano accompaniment in the lessons, I have intonation problems. Interpretation and musicality are lacking. Online education limits me in this respect and I cannot devote myself to the piece. I get nervous due to intonation and I have anxiety about singing correctly."

9th student: "Voice education lessons should be accompanied by piano. Because piano accompaniment to the vocal performance is a lively and dynamic artistic process. The student's reference to the sounds of piano is an important factor in increasing the efficiency of the lessons. Piano and vocal performance is also an extensive area to study. For this reason, piano accompaniment in voice training lessons has an important place in terms of efficiency. The absence of piano accompaniment in the lessons negatively affects my performance in terms of musical expression.

12th student: "I definitely think that the studies should be with piano accompaniment. Because from the beginning of the works, accompaniment, tempo, nuance, detone, etc. minimize errors. It is also musically more satisfying."

20th student: "I am most unhappy with this. Singing with accompaniment makes me feel more confident and powerful. I feel more comfortable. The lack of companionship makes me unhappy."

**Category: Professional Practice**
Question 9: "Do you believe that you can easily reflect the voice training you received during the distance education process to use your voice in the lessons at the practice schools and in your future professional life?" While 17 of 20 students gave a positive answer to the question, 3 of them gave a negative answer due to the distance education. Students who responded positively generally stated that they believed this because of the face-to-face training they received before. Example sentences:

8th student: "No, I don't think I can reflect, because distance education has completely negative effects for me."

13th student: "As I had already established the basics of voice education, it was easy for me to understand when we added new information during the distance education process. Because I could basically understand what was being said. I don't think I'll have any problems reflecting on myself."

19th student: "I think that I can reflect comfortably as a result of the theoretical knowledge and practices I gained in face-to-face education. However, I think we are missing a lot, especially in terms of implementation, due to distance education."

Question 10: "Do you believe that you can easily reflect the voice training you have received in training the voice of your students?" While 11 students stated that they could reflect on the knowledge and skills they had acquired in the face-to-face education process with their own efforts and gaining experience, 9 students gave a negative answer that they did not believe because of the education they received in the distance education process. Some example from their responses are:

4th student: "I do not believe that I can reflect comfortably based on the education I have received at the moment. However, it can be achieved by gaining knowledge, skills and experience in my future professional life."

6th student: "If I had started my voice education lessons with distance education in the first year, I could neither apply it properly in my own life nor pass it to my students. I definitely do not think that the basics of voice training courses can be given with distance education for a beginner. But for two and a half years, I made an effort to improve myself in this course with face-to-face education at school, and after that, I came to a level where I could study and sing new songs myself. Therefore, I think that I can add new things to my voice education with my own efforts and support my students in this regard in my professional life."

8th student: "I don't think I can reflect the voice training I received during the distance education process in educating the voices of the students. I have always learned the knowledge and skills that I can easily reflect in the education of the voice of the students in face-to-face education."

20th student: "I may have problems in this sense. Because right now we can only do enough lessons to solve the current situation. For example, I do not have the opportunity to be in the study room, to make observations, and to listen to my friends, which is a complete loss for me."

**Category: Learning-Teaching Process**
Question 11: "What are the different problems you experience in the teaching of voice training lessons during the distance education process?" While 10 students stated that there was no different problem, 10 students stated that the biggest problem was the lack of face-to-face education, the difficulties of teaching at home and the ineffectiveness of the lessons. Some examples:

Student 1: "While I can sing loudly at school, I have problems at home such as being afraid of neighbors, not being able to get a voice, singing without accompaniment and losing the tone."

5th student: "I actually have general problems, such as not being able to have the lessons or not being efficient"

7th student: "The problem I have the most is not getting much efficiency from the lessons and getting distracted."

8th student: "In fact there are many issues, but the most obvious problem is that we can't have classes effectively and it doesn't contribute to us in any way. We are not even where we started off, on the contrary, when we look at the application, we have regressed."

13th student: "I think that I have regressed in performance due to the loss of motivation I have experienced."

Question 12: "What are your different requests and suggestions for the teaching of voice training courses in the distance education process?" To this question, 14 students stated that they do not have any requests or suggestions, they think the lessons were done in the most efficient way possible during the distance education process and they did not find it sensible that the voice education lesson is done remotely. On the other hand, 6 students suggested having face-to-face voice training lessons, having more communication with the instructors, and sending the works as a recording in the exams. Some example from their responses are:

1st student: "It is not possible for me to make any requests or suggestions other than face-to-face education. In these circumstances, the best method that can be applied is applied."

Student 2: "The thing I want most about the lessons is that at least the music lessons can be taught face-to-face in accordance with the conditions we are in."

6th student: "The benefit of face-to-face education cannot be compared with online education, but since we cannot do anything about it, we will try our best to continue our lessons."

8th student: "I will both request and suggest that distance education be ended for voice training lessons. Because I could not see its positive effect in any way."

10th student: "There are problems in this process, especially in the voice training exams held in the mid-term and at the end of the semester. I think that the exams are not efficient enough because the devices have noise suppression, the devices cannot pass the sound as it is, and the sound becomes mechanical. My voice does not sound natural and beautiful enough. As a suggestion regarding this problem, sending audio recordings of the works will be more comfortable for both the student and the teacher as the listener."

18th student: "I don't know if it is appropriate in terms of the process we are in and the conditions in the current situation, but at least it is my request that our individual lessons be held face to face, not from a distance learning, and that each student conducts lessons in our own school in different time periods, in accordance with the pandemic conditions we are in. Although such face-to-face lessons with our teachers at school will be considered risky, at least in this period when we cannot meet face-to-face with our teachers and our communication is quite low, it can be seen as a suggestion to be in more communication and to complete this development process more closely and in more detail."

## CONCLUSION, DISCUSSION AND RECOMMENDATIONS

Based on the opinions of the music teacher candidates, the results obtained in this research, which was conducted to determine the suitability of the distance education model for the voice education lesson, generally show that the "Voice Education" lesson, which is an application-oriented lesson, is not suitable for teaching with the distance education model.

In the distance education process, due to the fact that the voice training lessons are limited to the determined session hours, 10 students stated that the time was insufficient in terms of weekly lesson hours, 5 students stated that the time was insufficient because they had problems with attending the lesson and 5 students stated that the lessons were actually insufficient but they gave a positive response because the online lessons created more burden than formal education for them and they have problems focusing which they took on themselves. According to this result, it can be said that the voice training course hours are not sufficient in the distance education in general. Singing is a skillful art, not a natural process. It requires highly developed muscle reflexes and coordination. In order for the singing training to be effective, the necessary muscle structure should be obtained with planned exercise programs. Coordination of all processes in singing is achieved by the harmony of a strengthened, alert, lively mind and a healthy and lively body structure. Therefore, regular and carefully planned workouts many times a week should be the goal of all singers (McKinney, 1994, p. 179, 200). In this context, it can be concluded that the one-hour voice training lessons once a week are not sufficient in terms of student development, considering the technical problems and communication problems experienced in the distance education experience.

In general, the most common problems that are identified are the internet connection problems, issues caused by the devices students use, problems with the system, audio transmission and communication problems, inability to focus on lessons, decrease in communication with teachers and efficiency of lessons.

Since the distance education model is linked to technology, system-related problems affect everyone who benefits from this application (Çığlık and Bayrak, 2015, p. 93). For instance, it is seen that 75% of those who receive education online in the USA leave the system without completing their education. This shows that distance education over the internet brings many problems with it (Karpenko, 2008; cited by Toker Gökçe, 2008, p. 9).

The organized distance education model is an education system with only a few centuries of history. Its historical development shows that distance education can only be beneficial when used in a mixed system that supports face-to-face education. Otherwise, it is not possible for distance education to be sufficient on its own. The reasons for this situation can be listed as follows:

• Decreased quality of education due to infrastructure inadequacies of technologies such as the Internet.
• The reflection of inequalities in access to infrastructure on the level of education received by the student.
• Negative impact of the physical environment and conditions of the student while the education takes place, on the motivation of the student and regular study opportunities.
It is understood that it is not possible to deal with these problems without face-to-face training, both in history and in the current pandemic period (Can and Köroğlu, 2020, p. 370).

The most common problems in voice training lessons are primarily about mental and physical comfort, correct posture and musical singing which re followed by the issues about diaphragm breathing and the sound-breath connection, about taking the sound into the resonance field, about the register, about rhythm, melody, intonation and articulation, and sometimes all of the above. These data show that students experience significant problems in terms of technique and interpretation in voice education courses in the distance education process.
However, the art of singing, like every art, has a technical-mechanical aspect and an aesthetic aspect. A singer (student) who cannot overcome technical-mechanical difficulties will never achieve aesthetic perfection (Marchesi, undated). According to Davran (1997, p. 44); "The art of singing is the act of achieving the secrets of the human body and soul by controlling all the muscles in our body related to the work of singing and using these muscles properly."

Reuter (2001, p. 8), on the other hand, states that the important components that make up the vocal technique and that a trained singer should gain are gathered in the following ten subjects:
• Perfect respiratory control
• Clean and full voice tunes as well as excellent intonation
• Mastery of musical dynamics and ability to practice messa di voce
• Clear and understandable articulation
• Balance of vocal (vowel) sounds in terms of uniformity of tone and clear sound reproduction
• A resonant, timbre and powerful sound
• Unity-integrity of voice registers in terms of timbre
• Smoothness of tone and musical line
• Agility and flexibility in coloratura sounds
• Technical management of musical expression in legato, martellato and staccato

In the light of these definitions, it can be said that it is very difficult for the students to acquire the knowledge and skills based on the technique and interpretation required by the art of singing, through the courses made with the distance education model.

Other problems experienced in voice training classes are the interruption of the lessons due to internet interruption and internet connection problems, the mechanicalization of the voices of the students and their inability to contact the instructor spontaneously, the synchronization problem with the instructor during the exercises and performance, the problems in communication and agreement during the lesson, and because of the remoteness of training, they cannot feel the support of the trainer as in face-to-face training.

It is seen that open and distance education applications, which have been applied professionally in Turkey about 40 years ago and have come to the fore due to the Coronavirus (Covid-19) pandemic, have become the main source of education, and need to be developed both in terms of quantity and quality. There needs to be precautions taken for future applications according to and based on the research data to be conducted on the effectiveness of open and distance education applications, and by considering primarily the problems encountered and the interest and participation of students, teachers/academicians, parents and society to the open and distance education applications. Perceptions, views and thoughts before the coronavirus (Covid-19) pandemic, regarding open and distance education as an alternative learning approach or as performing an auxiliary function have completely changed. The pandemic and post-pandemic developments have made open and distance education a "main learning resource". Nevertheless, the current pandemic shows that the open and distance education system in Turkey needs to be strengthened in terms of infrastructure, access, content, design, implementation, quality, security, legislation and pedagogy (Can, 2020, p. 42, 43).

On the other hand face-to-face, one-to-one and interactive transfer are extremely important and indispensable elements in education. As every teacher has a unique method of expression, every student has their own perception capacity and learning style. In case of insufficient or lack of interaction in education, the teacher will not be able to benefit from auxiliary elements that will directly affect the expression such as face, hand, arm and body movements, tone of voice. Likewise, students will not be able to get full efficiency from education without the help of these elements. At this point, distance education will be much more beneficial by providing interaction

similar to traditional classrooms and making use of the opportunities offered by technology. "Most distance education students need guidance and support in order to be able to do the work that needs to be done for the education program. This support should normally be in the form of a student-student and student-instructor combination" (Distance, 1997). Regardless of their type and level, students need to be motivated by their teachers and a structured education system in every aspect. The complaints frequently expressed by students who continue the distance education system are about the feeling of distance and lack of communication with their teachers. In this context, the most important and primary factor for the success of the student in the distance education program is directly proportional to the level of two-way interaction (Ruksasuk, 1999, p. 5). Fourie (2001, p. 11) states that the most problematic issue is the passive conduct of education, since the lessons cannot be held face-to-face in internet-based education (cited in: Odabaş, 2003, p. 11).

According to a similar view, students may have communication problems with their friends, instructors and university in distance education. At this point, establishing an open communication with the instructor of the course is of great importance in the successful completion of a course or program (Bakioğlu & Can, 2014, p. 26).
According to another result of the research, the majority of the students stated that they taught the lessons practically, but they stated that the lessons were insufficient in terms of both theoretical and practical content compared to face-to-face education.

To the question of "Can you easily put the theoretical knowledge you have acquired in the lessons into practice?" 11 out of 20 students answered positively, 9 students stated that they had difficulties in practice because the lessons were not face-to-face with the instructor, because they attended the lessons via phone, due to the device screen's insufficiency, and because they could not see the instructor while they spoke during the lessons.
Sabar (2008, p. 15) states that a person's vocal potential and talent can be developed with a good trainer and theoretical knowledge, as well as with qualified voice training, which will mostly be done with correct and appropriate practices. In this context, it would be correct to follow a path from easy to difficult, from simple to complex, with expressions and practices that the individual receiving voice training can perceive. Since the human voice has a lively, natural and sensitive structure, its education also requires sensitive, attentive, self-sacrificing and patient work and practice.

To the question of "Do you think that you were trained with songs suitable for the characteristics of your voice and the development process during the distance education process?", 17 out of 20 people gave a positive opinion and 3 gave a negative opinion. This result shows that the majority of the students do not have any problems with the vocal education repertoire.

In this study, all 20 students stated that it is necessary to be trained with piano accompaniment. Benefits of piano accompaniment are learning the song more easily, contributing to the intonation, singing the songs more confidently, accurately and musically, increasing the respect, interest and motivation to the lesson, contributing to the development of vocal training, contributing to seeing, feeling and singing the song as a whole, improving the sense of hearing and creating the harmonic infrastructure. specified. The majority of the students stated that the absence of piano accompaniment in the lessons affected them negatively.

They stated that they believe they can do this with their own efforts and as they gain experience, thanks to the face-to-face training they received before, in order to reflect the voice training they received during the distance education process, in the lessons at the practice schools and in the future professional life.

To the question of "What are the different problems you experience regarding the processing of voice training lessons during the distance education process?" 10 students stated that there was no different problem to the question, 10 students stated that the biggest problem was the lack of face-to-face education, the difficulties of teaching at home and the ineffectiveness of the lessons.

To the question of "What are your different requests and suggestions for the processing of voice training lessons in the distance education process?" 14 students responded that they did not have any requests or suggestions since they thought the lessons were given in the most efficient way possible during the distance education process and they did find it problematic that the voice education lesson could be done remotely. On the other hand, 6 students suggested that if possible, doing face-to-face voice training lessons, to be in more communication with the instructors, and to send the works as a recording in the exams.

To state an overall perspective, human beings have a learning power that other living things do not have, and learning has great importance in terms of influencing perception, thought and behavior at every stage of human life (Kaya, 2002, p. 2). "Teaching, on the other hand, is the planning, implementation and evaluation of external

events that support and provide learning, which is an internal process and product" and the success of the teaching process depends on the quality planning of the teaching (Senemoğlu, 2005, p. 397).

New technologies shape learning and teaching practices with the convenience they provide. It can be said that the distance education model is the strongest example of this. On the other hand, for effective distance education practices, learning and teaching theories should be well known and should be taken into account in instructional design processes. In addition, it is thought that research on a subject area provides data that guides the processes in that area, so the development line of a field can be understood by examining the studies done in that field (Dargut et al., 2016, p. 76).

The human voice, which is a natural and unique instrument, within life, has a fundamental importance in expressing ourselves both in communication and in oral arts and song art. Making the best use of a person's vocal potential, preserving vocal health and using the voice in its natural state is an extremely sensitive and important issue. In this context, the best realization of the objectives determined in voice training depends on the quality of the trainer and the training process. This research shows that even though the technology-based distance education model was applied during the pandemic period, it is not a suitable education model for voice education lessons within the scope of music education. Therefore, it can be said that it may be beneficial to use distance education as an education model that supports face-to-face education.

The following can be suggested as a result of the research:
• As far as known there is no study on this subject in the field of voice education in Turkey. New research and postgraduate thesis studies based on qualitative and quantitative research methods could be done, with the consideration of the outcomes of this research.
• This research, which was carried out based on the opinions of the music teacher candidates to determine the suitability of the distance education model for the voice education lesson, can also be conducted on the opinions of the voice educators.
• This study, which is for the field of vocal education, can also be done for other fields of music education with different research methods.
• Necessary measures can be taken according to the course of the pandemic and studies can be carried out to conduct face-to-face voice training and other applied music education courses.
• In general, studies can be carried out in universities, especially in applied fields, by taking the necessary precautions to conducting the courses face-to-face.

Finally, it can be said in the context of the conclusion and suggestion of the research, education is of vital importance in terms of revealing the potential of a person, directing them correctly, and developing them in the most effective and efficient ways. Robinson (2003, p. 231) has emphasized the importance of education and learning in human life with these words: "Education and learning are the keys to the door to the future, but a key can be turned in both directions. When you turn it in one direction, you lock resources out of reach even to those who have them. If you turn it the other way, you free up resources and give people back to themselves."

**REFERENCES**
Bakioğlu, A. ve Can, E (2014). *Uzaktan eğitimde kalite ve akreditasyon* (1. bs.). Ankara: Vize Yayıncılık.
Balcı, A. (2004). *Sosyal bilimlerde araştırma-yöntem, teknik ve ilkeler* (4. bs.). Ankara: Pegem A Yayıncılık.
Banar, K. ve Fırat, M. (2015). *Bütüncül bir bakıştan açık ve uzaktan eğitim*: Türkiye özeli. Yeğitek, Uzaktan Eğitim Özel Sayısı, 12: (pp.18-21).
    https://erzincan.meb.gov.tr/meb_iys_dosyalar/2015_01/30045149_egitekedergi.pdf adresinden erişildi.
Banks, F. et al (2007). *Costing open and distance teacher education: case study examples from sub-saharan Africa.* Washington D.C, USA: The World Bank Institute.
    https://wikieducator.org/images/1/1a/Costing_Study_101907.pdf. adresinden erişildi.
Birkök, M. C. ve Vuranok, T. T. (2010). *Uzaktan eğitim ile bilgi ihtiyacının karşılanması: bir üniversite programı önerisi.* Uluslararası İnsan Bilimleri Dergisi, 7 (2): (pp.427-444).
    https://www.j-humansciences.com/ojs/index.php/IJHS/article/view/1008/590 adresinden erişildi.
Can, E. (2020). *Coronavirus (Covid-19) pandemisi ve pedagojik yansımaları: Türkiye'de açık ve uzaktan eğitim uygulamaları.* Açıköğretim Uygulamaları ve Araştırmaları Dergisi, 6 (2): (pp.11-53).
    https://dergipark.org.tr/tr/download/article-file/1179832 adresinden erişildi.
Can, N. ve Köroğlu, Y. (2020). *Covid-19 döneminde yaygınlaşan uzaktan eğitimin değerlendirilmesi ve eğitim emekçileri açısından incelenmesi.* Madde, Diyalektik ve Toplum, 3 (4): (pp.370-380).
    http://bilimveaydinlanma.org/content/images/pdf/mdt/mdtc3s4/covid-19-doneminde-yayginlasan-uzaktan-egitimin-degerlendirilmesi-ve-egitim-emekcileri-acisindan-incelenmesi.pdf adresinden erişildi.
Çelik, D. (2016). *Küreselleşme ve yükseköğretimin dönüşümü bağlamında Türkiye'deki uzaktan eğitim*

*merkezlerinin amaç ve faaliyetleri üzerine bir içerik analizi.* Eğitim Bilim Toplum Dergisi, 14 (55): (pp.117-137).
https://egitimsen.org.tr/wp-content/uploads/2016/11/117-137_Hakemli-Makale.pdf adresinden erişildi.

Çevik, S. (1999). *Koro eğitimi yönetimi ve teknikleri* (1. bs.). Ankara: Yurtrenkleri Yayınevi.

Çığlık, H. ve Bayrak, M. (2015). Uzaktan öğrenme ve yapısalcı yaklaşım, *IJODE*, 1(1): (pp.87-102).
https://www.academia.edu/19550539/Uzaktan_Öğrenme_ve_Yapısalcı_Yaklaşım adresinden erişildi.

Dargut, T. ve Diğer. (2016). *Uzaktan eğitim araştırmaları üzerine kesitsel bir alan yazın incelemesi.* Açıköğretim Uygulamaları ve Araştırmaları Dergisi, 2 (1): (pp.71-93).
https://dergipark.org.tr/tr/download/article-file/401370 adresinden erişildi.

Davran, Y. (1997). *Şarkı söyleme sanatının öyküsü* (1. bs.). Ankara: Önder Matbaacılık.

Demirel, Ö. (1999). *Kuramdan uygulamaya eğitimde program geliştirme* (9. bs.). Ankara: Pegem A Yayıncılık.

Ekiz, D. (2003). *Eğitimde araştırma yöntem ve metodlarına giriş* (1. bs.). Ankara: Anı Yayıncılık.

Geçtan, E. (1992). *İnsan olmak* (9. bs.). İstanbul: Remzi Kitabevi.

Gülnar, B. (2008). *Bilgisayar ve internet destekli uzaktan eğitim programlarının tasarım, geliştirme ve değerlendirme aşamaları (Suzep Örneği).* Selçuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 19: (pp.259-271). http://dergisosyalbil.selcuk.edu.tr/susbed/article/view/416/398 adresinden erişildi.

Greene, A. (1975). *The new voice "how to sing and speak properly"* (1. bs.). USA: Chappel&Co., Inc.

Jung, J. Y. (2010). *Young singer and the repertoire.* Yayınlanmamış Doktora Tezi, University of Washington, USA.

Karasar, N. (2002). *Bilimsel araştırma yöntemi* (11. bs.). Ankara: Nobel Yayın.

Kaya, Z. (2002). *Uzaktan eğitim* (1. bs.). Ankara: Pegem A Yayıncılık.

Marchesi, M. (Tarihsiz). *Marchesi's vocal method* (1. bs.). London, NW2 6QR. EdwinAshdown Limited.

McKinney, J.C. (1994). *The diagnosis and correction of vocal faults: a manual for teachers of singing and for choir directors.* (2. bs.). USA: Nashville, Genevox Music Group.

Odabaş, H. (2003). *İnternet tabanlı uzaktan eğitim ve bilgi ve belge yönetimi bölümleri.* Türk Kütüphaneciliği, 17 (1): (pp.22-36).
http://www.tk.org.tr/index.php/tk/article/view/167 adresinden erişildi.

Ömür, M. (2001). *Sesin peşinde* (1. bs). İstanbul: Pan Yayıncılık.

Reuter, J. F. (2001). *The development of the singing voice by Franziska Martenssen-Lohmann: a critical translation.* Yayınlanmamış Doktora Tezi, University of Washington, USA.

Robinson, K. (2003). *Yaratıcılık "aklın sınırlarını aşmak"* (1. bs). İstanbul: Kitap Yayınevi.

Sabar, G. (2008). *Sesimiz "eğitimi ve korunması"* (1. bs). İstanbul: Pan Yayıncılık.

Senemoğlu, N. (2003). *Gelişim, öğrenme ve öğretim.* (12. bs.). Ankara: Gazi Kitabevi.

Sönmez, V. (2005). *Eğitim Felsefesi* (7. bs.). Ankara: Anı Yayıncılık.

Sönmez, V. (2007). *Program geliştirmede öğretmen elkitabı* (13. bs.). Ankara: Anı Yayıncılık.

Sözen, N. (2020). *Uzaktan eğitim sürecine yönelik karma model önerileri.* Ö. T. Kara ve S. Erol (Yay. Haz.). Güncel Alan Eğitimi Araştırmaları II. (s.1-25). Ankara: Akademisyen Kitabevi.

Tan, Ş ve Erdoğan, A. (2004). *Öğretimi planlama ve değerlendirme* (6. bs.). Ankara: Pegem A Yayıncılık.

Tanilli, S. (1989). *Nasıl bir eğitim istiyoruz?* (3. bs.). İstanbul: Amaç Yayıncılık.

Toker Gökçe, A. (2008). *Küreselleşme sürecinde uzaktan eğitim.* Diyarbakır Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi, 11: (pp.1-12).
https://dergipark.org.tr/tr/download/article-file/787151 adresinden erişildi.

Torkul, O. (2012). *Uzaktan eğitim ve Türkiye'de yaygınlaşması önündeki engeller.* Eğitime Bakış, Eğitim-Öğretim ve Bilim Araştırma Dergisi. 8 (23): (pp. 42-44).
https://www.ebs.org.tr/ebs_files/files/yayinlarimiz/Egitime_Bakis_23_Sayi.pdf adresinden erişildi.

Tuncer M. ve Taşpınar, M. (2008). *Sanal ortamda eğitim ve öğretimin geleceği ve olası sorunlar.* Sosyal Bilimler Dergisi, 10 (1): (pp. 125-144).
https://kutuphane.dogus.edu.tr/mvt/pdf.php?pdf=0007348&lng=0 adresinden erişildi.

Uşun, S. (2006). *Uzaktan eğitim.* (1. Baskı) İstanbul: Nobel Yayın Dağıtım.

Vennard, W. (1967). *Singing: The mechanism and the technic* (1. bs.). Newyork: Carl Fischer, Inc.

Wei, C. T. (2006). *Role and efficacy of verbal ımagery in the teaching of singing: case study and computer vocal analysis.* Yayınlanmamış Doktora Tezi, Baptist University, Hong Kong.

Yamamoto, G. T. ve Altun, D. (2020). *Coronavirüs ve çevrimiçi (online) eğitimin önlenemeyen yükselişi.* Üniversite Araştırmaları Dergisi, 3 (1): (pp. 25-34). doi.org/10.32329/uad.711110

Yang, R. ve Vidovich, L. (2002). *Üniversiteleri küreselleşme bağlamında konumlandırmak.* Kuram ve Uygulamada Eğitim Bilimleri, 2 (1): (pp. 209-222).
https://app.trdizin.gov.tr/makale/TWpFek1EQT0/universiteleri-kuresellesme-baglaminda-konumlandirmak adresinden erişildi.

Yıldırım, A. ve Şimşek, H. (2004). *Sosyal bilimlerde nitel araştırma yöntemleri* (4. bs.). Ankara: Seçkin Yayıncılık.

**APPENDIX 1**

**INTERVIEW QUESTIONS FOR STUDENTS TO DETERMINE THE SUITABILITY OF THE DISTANCE EDUCATION MODEL FOR THE VOICE EDUCATION COURSE**

Category: Lesson Duration
1. Is the voice training you received during the distance education period sufficient in terms of weekly lesson hours, since the lessons are limited to the determined session hours?

Category: General Issues
2. What are the most common problems you encounter during the distance education process in general?

Category: Problems Related To Use Of Voice
3. What are the most common problems you encounter in voice training courses during the distance education process?
a) Relating to mental and physical comfort
b) Regarding correct posture
c) Pertaining to diaphragmatic breathing
d) Relating to voice-breath connection and correct sound reproduction
e) Relating to receiving the sound in the resonance region (timbre-vibration)
f) Register related (head voice-chest voice transitions)
g) Related to rhythm, melody, intonation and articulation
h) Relating to musical singing and interpretation
ı) Apart from these, is there any problem you would like to add, and if so, what is it?

Category: Learning-Teaching Process
4. Do you learn courses theory-oriented or application-oriented? How does this affect you?
5. Is the voice training you received in the distance education process sufficient in terms of theoretical and practical content?
6. Can you easily put the theoretical knowledge you have acquired in the lessons into practice?
7. Do you think that you were trained with songs suitable for your voice characteristics and development process during the distance education process?
8. Do you believe it is necessary to practice with piano accompaniment? Why? How does the absence of piano accompaniment in the lessons affect you?

Category: Professional Practice
9. Do you believe that you can easily reflect the voice training you received during the distance education process when using your own voice in the lessons at the practice schools and in your future professional life?
10. Do you believe that you can easily reflect the voice training you have received in training the voice of your students?

Category: Learning-Teaching Process
11. What are the different problems you experience regarding the teaching of voice training lessons in the distance education process?
12. What are your different requests and suggestions for the processing of voice training lessons in the distance education process?

# Teachers' Perception of Emergency Remote Learning in Portugal During Covid-19 Pandemic

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**ABSTRACT**
The COVID-19 pandemic has highly impacted our society, particularly educational professionals, on their daily routines and changing the way they work. COVID-19 spread quickly, and we had to take urgent action on closing schools so teachers would continue to teach their students and put stringent measures such as national lockdowns and social distancing initiatives. The present study aims to understand teachers' perceptions regarding the operationalization of Emergency Remote Learning in Portuguese schools. The study also seeks to measure differences in satisfaction level, attitudes, and challenges across teaching methodology adopted by teachers. It will be used as a quantitative study, using a survey as a technical procedure for data collection to meet the proposed objectives. Data collection lasted two months, implemented through the availability of the study online on social networks, for teachers to respond voluntarily. Findings show that the COVID-19 pandemic and social distancing requirement has presented undue challenges for all education stakeholders, especially teachers. The teachers felt exhausted, but they recognized that the Technology has made a significant contribution and showed a willingness to learn more to integrate technologies into their practice and recognize the importance of this being done effectively.

**INTRODUCTION**
On January 30, 2020, the World Health Organization identified the SARS-CoV-2 epidemic as an international public health emergency. On March 11, 2020, characterized the virus as a pandemic due to the high number of affected countries. Due to the threat of COVID-19, educational institutions had to make decisions regarding the adoption of a form of teaching that would allow, at the same time, to keep students, teachers, and staff safe from a new virus, but also to continue with the one that it is the meaning of the school, the pedagogical relationship of Teaching/Learning. The Pandemic led to a rapid transition from the usual face-to-face teaching modality to a fully online modality called 'emergency remote teaching'. This abrupt change generated fear of the unknown, created anxiety in school communities, led teachers to quickly reconfigure their pedagogical projects and strategies (Green, Burrow & Carvalho, 2020). According to Lee and Campbell (2020), today's education needs to create a new teaching and learning environment.

This article presents a study in which we intend to explain teachers' perceptions regarding the operationalization of Emergency Remote Learning in Portuguese schools. Data collection was based on the application of a survey with 18 closed and 6 open questions. In the exploratory analysis phase of the construction process of this survey, we collected data on the perception of teachers regarding emergency remote teaching. Then, based on information collected from teachers and on existing literature on the area, we built a survey available online to be applied to teachers at different levels of education. It should be noted that experts in the field of education were consulted, and pilot tests were carried out to validate the data collection instrument and, based on these results, the survey was subsequently reformulated to the final version. We made the survey available on February 21, 2021, through

digital channels and ended responses on April 21, 2021. Teachers from pre-school to higher education voluntarily participated in our survey, in a total of 1083 respondents from different parts of Portugal and mainly in the public education system. In general, we realize that many teachers do not use Virtual Learning Environments and those who do, refer to opting for Google Classroom or Microsoft Teams as LMS (Learning Management System) platforms. The LMS platforms is a virtual environment that makes it possible to manage online learning. It was possible to identify the use of different videoconference communication platforms such as Skype, Google Meet, Zoom, Webex, among others, to guarantee synchronous sessions, although without knowledge of synchronous and asynchronous concepts. The results obtained show that teachers show fatigue in remote classes, they feel tired looking at the screen, but at the same time, this type of teaching made them feel secure regarding the transmission of the virus. Based on the results obtained from the teachers' answers, we end this article presenting some suggestions for future investigations.

The article addresses the issue of remote learning in the COVID-19 Pandemic, then presents the methodology adopted in the study and its description. Subsequently, the construction collection process is explained and, finally, the results and conclusions regarding the information collected through the described survey. Finally, it ends with some proposals for future work.

## LITERATURE REVIEW

Distance Learning is a modality of education through which technology is necessary to involve students in learning (Moore & Kearsely, 2011). Online teaching assumes that students and teachers do not need to be in the same physical environment for the learning process. Students and teachers are connected through an online learning system called the e-learning platform in online teaching. As in online education, there is no physical classroom where guidance is provided before an activity. So, it is essential to prepare a plan, for example, a weekly guide or a monthly guide where students can consult all the information and guidance necessary to follow the online classes (Monteiro, Moreira & Lencastre, 2015).

E-learning is a form of distance learning, but distance learning is not e-learning (Rosenberg, 2006). Both e-learning and distance learning involves students working on computers or other mobile devices. However, in e-learning, students can stay together in the same space while their classes and assessments occur. In distance learning, lessons and assessments can take place online with students at home. Due to this, the interaction between students and teachers will be different in e-learning and distance learning because e-learning involves personal interaction, and distance learning does not include meeting in person. Therefore, E-learning provides a learning opportunity for physically distant people (Moore & Kearsely, 2011). In e-learning, the student becomes a self-directed learner and learns simultaneously and asynchronously at any time (Maatuk, Elberkawi, Aljawarneh, Rashaideh & Alharbi, 2021). Thus, online learning improves student engagement and performance (Khlaif, Salha & Kouraichi, 2021). More than transmitting knowledge, the teacher must now guide the student's learning process to develop their abilities, namely learning to learn, self-learning, and autonomy (Moreira, Henriques & Barros, 2020).

The evolution of technologies and forms of communication has caused changes in society, boosting the birth of new pedagogical models, educational communication processes, and new teaching-learning processes (Garrison & Anderson, 2005; Moreira, Henriques & Barros, 2020). With the COVID-19 pandemic, schools were closed, and distance learning for all subjects or courses became a daily practice. This change forced teachers and students to a new professional reality. In addition to a professional challenge for teachers, this adaptation was also an organizational challenge in conducting the entire teaching process for schools (Cicha, Rizun, Rutecka & Strzelecki, 2021). The COVID-19 pandemic led to rapid and emergency change, almost obligatorily. Educational institutions and teachers were forced to adopt emergency remote learning (ERL) practices (Moreira, Henriques & Barros, 2020; Green, Burrow & Carvalho, 2020). Remote learning needs adaptability and good planning (Marek, Chew & Wu, 2021). The transition from a face-to-face teaching regime to a distance teaching/learning process, in an emergency such as the COVID-19 pandemic, generated constraints in various sectors of society (Durão & Raposo, 2020). To continue teaching, teachers had to quickly reconfigure their plans and pedagogical strategies according to the new learning scenario (Green, Burrow & Carvalho, 2020). The suspension of classroom teaching activities led students and teachers to the reality of distance learning, transferring and transposing methodologies and pedagogical practices typical of physical learning territories to what the literature has called emergency remote learning (Moreira, Henriques & Barros, 2020). In a research study by Onyefulu (2021) aimed to investigate teachers' perceptions of leadership effectiveness in emergency remote learning during the coronavirus pandemic. This author realized that most of the teachers were of the view that their leaders provided them information about the e-learning process and an opportunity to promote innovation dynamics at school. Also, Khlaif, Salha, and Kouraichi (2021), in their study where they sought to explore the factors that influence student engagement in online learning during emergency remote learning, found that emergency remote learning during pandemic COVID-19 negatively impacted student involvement in learning due to the new challenges they encountered

during the learning process, such as infrastructure, cultural, digital inequality, and digital privacy.

**METHOD**
This study was strongly anchored on the perception of Portuguese teachers from different disciplinary areas about how emergency remote learning went during the COVID-19 pandemic. An exploratory study was employed, including data collection, statistical and qualitative analysis. Data collection is based on the survey built by us and validity to the Portuguese population of teachers. Teachers were informed that their participation was voluntary, anonymous, and confidential, with no relationship with their school; thus, their opinions are protected by anonymity.

PARTICIPANTS
The targeted professionals work in the public and private sectors from Portugal. A total of 1041 teachers at a Portuguese school participated in this study. Teachers from different school years, and from many places in Portugal, took part in this study. The respondents are experienced teachers: 42% (438 teachers) have more than 25 years of service time, 26% (268 teachers) have twenty-one and twenty-five years of service, 16% (162 teachers) have sixteen and twenty years of service, 8% (81 teachers) have between eleven and 15 years of service, 8% (91 teachers) have less than ten years of service time as a teacher (Chart 1).
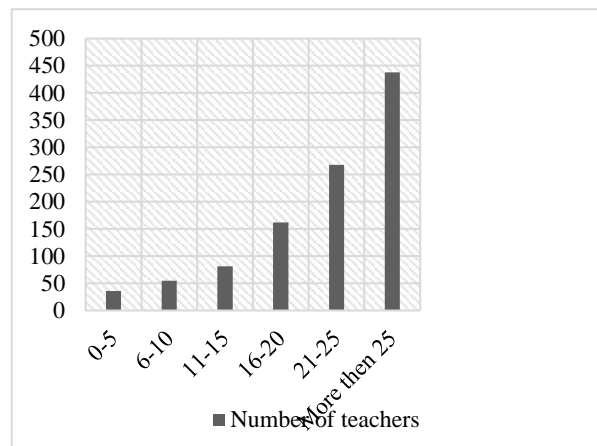


**Chart 1**: years of teaching service of teachers

DATA COLLECTION AND ANALYSIS
Data collection is based on the survey we built and its validity to the Portuguese population. The survey was implemented using Google forms and convenience sampling. The survey was made available and posted on social networks from March to May 2021. Respondents voluntarily participated by answering the survey.

Data analysis is focused on the understanding of remote learning during COVID-19 from the perspective of teachers. The investigators did not carry out any intervention in public, and the studied variables had only one measure in each of the participants. This work follows a quantitative study paradigm, with descriptive exploratory character to understand teachers' perception regarding the operationalization of emergency remote learning in Portuguese schools. We opted for an experimental study because the addressed topic is recent, and the information found can help characterize the context of emergency remote learning during the COVID-19 pandemic. The surveys included 22 questions and 18 closed-response items using a Likert-type scale of degree according to 5 points (from 1 = strongly disagree to 5 = strongly agree), allowing teachers to express how much they agreed or disagreed with the statements. It also has four open-response answers to get a more detailed view of the teachers' perception.
Three Education specialists validated the first version of the survey. Subsequently, the changes suggested by the experts were applied, and a pilot test was carried out with five teachers as the target audience of the survey. With the information collected on the pilot test, we reformulated the survey before publishing it on social networks.
A total of 1041 teachers answered the survey. The data was exported in Excel and analysed with the statistical software IBM® SPSS version 20 through descriptive statistical techniques such as frequency distributions, graphics, central tendency measures, and dispersion measures. We designated the information of each teacher in the surveys Ti (i = 1 ...1041).

**FINDINGS**
Findings show great diversity regarding what LMS platform teachers used, most in Remote Learning 2.0 classes.

Most teachers reported using Google Classroom alone or with other platforms such as Classdojo, BlackBoard, Story Jumper, Kahoot, Padlet, Quizizz, YouTube, Khan Academy, Canva, Voki, Whatsapp, Edpuzzle, Moodle, Wakelet, Pixton, and the Mentimeter. A smaller proportion of teachers claimed to use Microsoft Teams alone or with other platforms. Most of the surveyed teachers felt 'emotionally exhausted', 'exhausted at the end of a working day', 'tired out', but continued to feel like working. The perception of their professional performance divided the inquired teachers, with a significant part recognizing that they felt fulfilled and another part not.

The survey found that one hindrance for teachers was leaders' lack of incentive and the energy to do something significant in their online classes. However, it should note that around 78% of respondents report feeling relaxed during emergency remote learning because they have been able to rest more. Also indicated that by using emergency remote learning, they felt safe from getting the virus. Furthermore, they did not regularly commute to their schools to teach allowed them to sleep better and feel more relaxed during classes. In [Table 1], we present the perception about how they felt about their professional activity, in the table *f corresponds to the absolute frequency.

**Table 1**: Teachers' perception about how they felt about their professional activity.

| Question | Strongly Disagree | | Disagree | | Neutral | | Agree | | Strongly Agree | |
|---|---|---|---|---|---|---|---|---|---|---|
| | f* | % | f* | % | f* | % | f* | % | f* | % |
| Emotionally exhausted | 88 | 8,5 | 190 | 18,3 | 183 | 17,6 | 343 | 33,0 | 236 | 22,7 |
| Exhausted at the end of a working day | 49 | 4,7 | 120 | 11,5 | 130 | 12,5 | 384 | 36,9 | 357 | 34,3 |
| Tired out | 61 | 5,9 | 97 | 9,3 | 99 | 9,5 | 442 | 42,5 | 341 | 32,8 |
| Not willing to work | 280 | 26,9 | 413 | 39,7 | 156 | 15,0 | 132 | 12,7 | 59 | 5,7 |
| Not professionally performed | 200 | 19,2 | 320 | 30,8 | 182 | 17,5 | 204 | 19,6 | 134 | 12,9 |
| Lacking the incentive to do something significant | 200 | 19,6 | 326 | 31,3 | 157 | 15,1 | 253 | 24.3 | 104 | 10,0 |
| Lacking the energy to do something significant | 169 | 16,3 | 332 | 31,9 | 145 | 13,9 | 296 | 28,5 | 98 | 9,4 |
| I relaxed because I am not exposed to the risk of getting Covid-19 infection | 214 | 20,6 | 236 | 22,7 | 243 | 23,4 | 243 | 23,4 | 104 | 10,0 |
| Relaxed because I have been able to rest more | 481 | 46,3 | 326 | 31,3 | 131 | 12,6 | 78 | 7,5 | 24 | 2,3 |
| More confident because I have my family present | 180 | 17,3 | 243 | 23,4 | 298 | 28,7 | 226 | 21,7 | 93 | 8,9 |

During emergency remote learning, teachers had to use video conferencing platforms to keep in contact with students. Furthermore, teachers are more exposed because they also have more eyes on their class when they invade students' homes. Generally, teachers do not felt uncomfortable in videoconferences, but they felt tired when looking at the computer screen. In general, teachers did not have difficulty controlling the class, nor did they found it difficult to understand students. In addition, most teachers do not felt inhibited by being observed by people other than students; they did not felt embarrassed in front of the camera or had difficulty connecting with technical components. In [Table 2], we present teachers' perceptions of videoconferencing sessions, in the table *f corresponds to the absolute frequency.

**Table 2**: Teachers' perception of videoconferencing sessions.

| Question | Strongly Disagree | | Disagree | | Neutral | | Agree | | Strongly Agree | |
|---|---|---|---|---|---|---|---|---|---|---|
| | f* | % | f* | % | f* | % | f* | % | f* | % |
| Uncomfortable | 282 | 27,1 | 395 | 38,0 | 171 | 16,4 | 146 | 14,0 | 46 | 4,4 |
| Tired of looking at the screen | 93 | 8,9 | 151 | 14,5 | 98 | 9,4 | 469 | 45,1 | 229 | 22,0 |
| Difficulty controlling the class | 370 | 35,6 | 442 | 42,5 | 128 | 12,3 | 79 | 7,6 | 21 | 2,0 |
| Difficulty understanding students | 250 | 24,0 | 442 | 42,5 | 152 | 14,6 | 179 | 17,2 | 17 | 1,6 |
| Inhibited by being observed by others besides the students | 313 | 30,1 | 396 | 38,1 | 144 | 13,8 | 135 | 13,0 | 52 | 5,0 |
| Embarrassed before the camera | 403 | 38,8 | 414 | 39,8 | 135 | 13,0 | 69 | 6,6 | 19 | 1,8 |

| Difficulty connecting with technical components | 296 | 28,5 | 417 | 40,1 | 161 | 15,5 | 135 | 13,0 | 31 | 3,0 |
|---|---|---|---|---|---|---|---|---|---|---|

Regarding the feeling of security in a videoconference session, teachers' responses indicate that respondents were a little more optimistic than neutral about how secure they felt about working from home regarding the transferability of COVID-19 (M = 3,6). To understand the relationship of teachers with emergency remote learning, we created seven questions. With the first of the questions being the effectiveness of the classes, in emergency remote learning, the average teachers' answer (M = 3,28) had a standard deviation of 0,78. Regarding the second question, the emotional relationship established with the students, in emergency remote learning, the teachers' opinions also seem to be divided (M= 3,62), with a standard deviation of 0,92. Teachers recognize that the relationship they can establish with students is crucial to teaching with quality. In this sense, teachers fear that the distance between teacher and student caused by emergency remote teaching could bring serious problems related to health and motivation to learn. However, it should note that some teachers managed to establish an emotional relationship with the students, others found it a challenge. With the third question, we seek to understand how teachers would classify the operationalization of content with students achieved in emergency remote learning. The average teachers' answer was 3,2 (M=3,2) with a standard deviation of 0,85. In the fourth question, about using technological resources in emergency remote learning, the average teachers' answer was 3,7 (M=3,7) with a standard deviation of 0,77. In the fifth question, about synchronous class time management in emergency remote learning, the average teachers' answer was 3,55 (M=3,55) with a standard deviation of 0,83. A significant part of the teachers felt difficulty managing time. In the sixth question, about student emergency remote learning, the average teachers' answer was 3,0 with a standard deviation of 0,78. Finally, the seventh question, about asynchronous class time management in emergency remote learning, the average teachers' answer of 3,4 (M=3,4) with a standard deviation of 0,94, divided the teachers' opinions. The changes caused by the abrupt transition from a face-to-face teaching model to an emergency remote learning model caused difficulties for teachers. Regarding weaknesses identified in emergency remote learning, teachers reported feeling more tired (47%), the Internet connection failures (42,7%), the impotence to solve students' inequality problems (41,4%), the privacy change (29,5%), the technical equipment failures (30,9%), and the digital literacy of students. Note that the disorientation and lack of organization were not so much pointed out as limitations in emergency remote learning.

In [Table 3], we present teachers' perception of weaknesses teachers identified in emergency remote learning, in the table *f corresponds to the absolute frequency.

**Table 3**: Weaknesses teachers identified in emergency remote learning.

| Question | Strongly Disagree | | Disagree | | Neutral | | Agree | | Strongly Agree | |
|---|---|---|---|---|---|---|---|---|---|---|
| | f* | % | f* | % | f* | % | f* | % | f* | % |
| Loneliness | 176 | 16,9 | 245 | 23,6 | 179 | 17,2 | 326 | 31,3 | 95 | 9,1 |
| Tired | 53 | 5,1 | 110 | 10,6 | 91 | 8,8 | 489 | 47,0 | 289 | 27,8 |
| Internet connection failures | 55 | 5,3 | 145 | 13,9 | 134 | 12,9 | 444 | 42,7 | 249 | 23,9 |
| Disorientation | 271 | 26,1 | 409 | 39,3 | 221 | 21,2 | 102 | 9,8 | 25 | 2,4 |
| Lack of organization | 296 | 28,5 | 479 | 46,1 | 151 | 14,5 | 80 | 7,7 | 21 | 2,0 |
| Lack of clear superior guidelines | 142 | 13,7 | 309 | 29,7 | 201 | 19,3 | 261 | 25,1 | 121 | 11,6 |
| Impotence to solve students' inequality problems | 44 | 4,2 | 97 | 9,3 | 115 | 11,1 | 431 | 41,4 | 348 | 33,5 |
| Lack of equipment/tools to work | 142 | 13,7 | 243 | 23,4 | 183 | 17,6 | 300 | 28,8 | 160 | 15,4 |
| Difficulties in communicating with students | 141 | 13,6 | 343 | 33,0 | 220 | 21,2 | 273 | 26,3 | 51 | 4,9 |
| Power failures | 256 | 24,6 | 309 | 29,7 | 170 | 16,3 | 227 | 21,8 | 62 | 6,0 |
| Difficulty in capturing students' attention | 126 | 12,1 | 309 | 29,7 | 260 | 25,0 | 279 | 26,8 | 45 | 4,3 |
| Lack of collaboration on the part of guardians | 153 | 14,7 | 338 | 32,5 | 284 | 27,3 | 208 | 20,0 | 46 | 4,4 |
| Lack of motivation to work | 255 | 24,5 | 355 | 34,1 | 202 | 19,4 | 162 | 15,6 | 50 | 4,8 |
| Lack of digital skills | 292 | 28,1 | 379 | 36,4 | 189 | 18,2 | 137 | 13,2 | 29 | 2,8 |
| Changes in usual working hours | 231 | 22,2 | 312 | 30,0 | 198 | 19,0 | 193 | 18,6 | 89 | 8,6 |
| Lack of space to work | 288 | 27,7 | 356 | 34,2 | 154 | 14,8 | 162 | 15,6 | 67 | 6,4 |
| Privacy change | 135 | 13,0 | 217 | 20,9 | 208 | 20,0 | 307 | 29,5 | 163 | 20,9 |
| Technical equipment failures | 121 | 11,6 | 253 | 24,3 | 207 | 19,9 | 321 | 30,9 | 125 | 12,0 |
| Digital Literacy of Students | 73 | 7,0 | 170 | 16,3 | 224 | 21,5 | 405 | 38,9 | 155 | 14,9 |

The need for mass adoption of emergency remote learning due to the COVID-19 pandemic, regardless of education, age, or institution, has led to students, parents, teachers, and the entire society starting to monitor benefits and the challenges of this teaching model. According to most teachers, remote emergency education has several advantages for both teachers and students: student participation, student interaction, education, resilience, variety, creativity, domain of the platforms. It also brought challenges to teachers such as the ability to adapt strategies to this type of teaching, or to adapt learning activities, or the creation of dynamic classes with different activities. Regarding the competencies developed in their students, most teachers considered that remote emergency education promoted students' autonomy in carrying out tasks and helped seeking proximity and students' independence in carrying out assignments. Also, teachers believe that remote emergency education promotes the knowledge of new digital tools, easier to motivate students, to get empathy with students, to give feedback to students, and to enable regulatory input for the student. Regarding teacher attitudes, teachers identified the student participation (46,7%), the student interaction (44,6%), the resilience (58%), the variety (53,7%), the creativity (55,2), the ability to get everyone's presence (42,5%) and the ability to adapt strategies to this type of teaching (58,3%), as potentialities in emergency remote learning. Teachers also identified as the main potential of this teaching mode, the creation of dynamic classes with different activities (53%), the domain of the platform that teacher's use to support learning (53,6), the remote teaching pre-preparation (44,3%), the seeking proximity to students (46,8%), the promoting students' autonomy in carrying out tasks (55,3%), their efficiency (42,6) and live experience (47,7%). They recognize that the use of apps teacher facilitator-student interaction (47,3%), the challenge to leave the comfort zone (50,3), the knowledge of new digital tools (53,7%), the motivation of students (44,9 %), are also potentialities in emergency remote learning. In addition, for these professors, the empathy with students (43,8%), the availability to give feedback to students (44,3%) and the possibility of providing regulatory input for the student (45,2%) are also seen as potentialities of this emergency remote learning. A significant part of them noted that student participation (19,4%) and student interaction (22,7%) were enhanced by emergency remote learning. In [Table 4], we present potentialities identified by teachers in remote emergency education, in the table *f corresponds to the absolute frequency.

**Table 4**: Potentialities identified by teachers in emergency remote learning.

| Question | Strongly Disagree | | Disagree | | Neutral | | Agree | | Strongly Agree | |
|---|---|---|---|---|---|---|---|---|---|---|
| | f* | % | f* | % | f* | % | f* | % | f* | % |
| Student participation | 42 | 4,0 | 202 | 19,4 | 221 | 21,3 | 486 | 46,7 | 82 | 7,9 |
| Student interaction | 40 | 3,8 | 236 | 22,7 | 210 | 20,2 | 464 | 44,6 | 77 | 7,4 |
| Formation | 28 | 2,7 | 108 | 10,4 | 245 | 23,6 | 515 | 49,5 | 125 | 12,0 |
| Resilience | 15 | 1,4 | 56 | 5,4 | 153 | 14,7 | 603 | 58,0 | 201 | 19,3 |
| Variety | 19 | 1,8 | 77 | 7,4 | 237 | 22,8 | 558 | 53,7 | 138 | 13,3 |
| Creativity | 19 | 1,8 | 80 | 7,7 | 186 | 17,9 | 574 | 55,2 | 173 | 16,6 |
| Get everyone's presence | 45 | 4,3 | 175 | 16,8 | 223 | 21,4 | 442 | 42,5 | 141 | 13,6 |
| Ability to adapt strategies to this type of teaching | 19 | 1,8 | 81 | 7,8 | 165 | 15,9 | 606 | 58,3 | 162 | 15,6 |
| Ability to adapt learning activities | 19 | 1,8 | 81 | 7,8 | 168 | 16,2 | 606 | 58,3 | 156 | 15,0 |
| Create dynamic classes with different activities | 18 | 1,7 | 88 | 8,5 | 206 | 19,8 | 551 | 53,0 | 168 | 16,2 |
| Domain of the platform I use to support learning | 21 | 2,0 | 88 | 8,5 | 151 | 14,5 | 557 | 53,6 | 212 | 20,4 |
| Remote teaching pre-preparation | 56 | 5,4 | 132 | 12,7 | 217 | 20,9 | 461 | 44,3 | 161 | 15,5 |
| Daily support from guardians | 83 | 8,0 | 226 | 21,7 | 366 | 35,2 | 295 | 28,4 | 61 | 5,9 |
| Seeking proximity to students | 36 | 3,5 | 130 | 12,5 | 239 | 23,0 | 487 | 46,8 | 137 | 13,2 |
| Promoting students' autonomy in carrying out tasks | 23 | 2,2 | 75 | 7,2 | 146 | 14,0 | 575 | 55,3 | 214 | 20,6 |
| Efficiency | 43 | 4,1 | 151 | 14,5 | 309 | 29,7 | 443 | 42,6 | 85 | 8,2 |
| Optimism | 43 | 4,1 | 174 | 16,7 | 286 | 27,5 | 407 | 39,1 | 119 | 11,4 |
| Lived experience | 27 | 2,6 | 100 | 9,6 | 260 | 25,0 | 496 | 47,7 | 142 | 13,7 |
| Use of Apps that facilitate teacher-student interaction | 30 | 2,9 | 100 | 9,6 | 221 | 21,3 | 492 | 47,3 | 182 | 17,5 |
| Challenged to leave the comfort zone | 22 | 2,1 | 66 | 6,3 | 180 | 17,3 | 523 | 50,3 | 238 | 22,9 |
| Greater monitoring of students | 106 | 10,2 | 268 | 25,8 | 291 | 28,0 | 285 | 27,4 | 73 | 7,0 |
| Knowledge of new digital tools | 20 | 1,9 | 52 | 5,0 | 137 | 13,2 | 558 | 53,7 | 264 | 25,4 |
| Motivate students | 33 | 3,2 | 132 | 12,7 | 276 | 26,5 | 467 | 44,9 | 115 | 11,1 |
| Empathy with students | 34 | 3,3 | 122 | 11,7 | 267 | 25,7 | 455 | 43,8 | 147 | 14,1 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Availability to give feedback to students | 38 | 3,7 | 120 | 11,5 | 203 | 19,5 | 461 | 44,3 | 201 | 19,3 |
| Regulatory feedback for the student | 33 | 3,2 | 119 | 11,4 | 222 | 21,3 | 470 | 45,2 | 181 | 17,4 |

In emergency remote learning, students are physically distant, so it is essential to think and design teaching strategies that involve them in challenges and problem-solving. In addition, according to some interviewed teachers, it is necessary for greater monitoring of students, involving students more in active participation, and promoting autonomy. According to these teachers, students must have daily support from their tutors to seek proximity, motivate students, and challenge them to leave their comfort zone to promote a pedagogy that favours communication, the interaction between students and production to improve learning.

At the end of the survey, teachers had four open-response questions to get a more detailed answer of the teachers' perception about emergency remote learning. We sought to understand the teacher's perception regarding the positive and negative aspects of emergency remote learning with these questions.

Emergency remote learning had repercussions on work and on interaction between educational actors, affecting the way teachers teach and the way students learn. For the surveyed teachers, the emergency remote learning was "a challenging experience for teachers, students, and parents" [T12], and "it was the use of new technologies" [T214] that "increased digital literacy for students and teachers" [T216]. Nevertheless, they recognize that emergency remote learning "has allowed us to see education from a different perspective, challenging us to reflect on practices that have been established and outdated" (T187).

Teachers and students started distance classes with different skills in the use of technology and with unequal material conditions of access, which led the teachers to arrange different strategies. These teachers admit that they "have learned a lot but work even harder" [T70] in this mode of teaching. Nevertheless, it is teaching "more focused on pedagogical differentiation, on the student, on learning" [T4] because it allows "able to support a student individually" [T151; T574]. It is a teaching modality that "possibility of carrying out tasks in deferred time" [T37], allows a "closer connection with parents" [T74], and the "valuing the work of teachers by families" [T316].

Teachers had to prepare lessons that provided students with moments of learning. Teachers were used to preparing lessons for face-to-face teaching and suddenly had to organise tasks for Emergency remote learning while maintaining an effective relationship with the contents. Emergency remote learning requires digital skills from teachers, students and guardians. Schools, teachers, and students had to learn to use a set of digital resources that would allow them to communicate remotely and continue the work developed so far in the school's physical space. Teachers recognize that emergency remote learning requires a "domain of digital tools" [T348] but also "improving students' digital skills" [T305]. It favours "new technological learning and greater diversity of strategies to reach students" [T302], promotes "student autonomy and a gradual mastery of new technologies" [T319], and the "students' digital literacy" [T377; T635]. This is because it leads to the "stimulation of the need to think outside the box, of things differently, produce new activities that bring us closer to a hybrid teaching" [T90].

Time seems to be another aspect mentioned by teachers, as they state that in emergency remote learning, "students manage their time better, promote organization and autonomy in the learning process" [T787]. For the teacher, it also brings "greater tranquillity at work and better time management" [T819]. It leads to "stimulation of the need to think outside the box, to things differently, produce new activities that bring us closer to hybrid teaching" [T90] and the "capacity to reinvent being a teacher to maintain an effective teacher-student relationship by promoting autonomy, creativity and emotions" [T204].

For some teachers, emergency remote teaching was a period of articulation, integration and collaboration. Teachers report that this collaboration between peers helped exchange materials for lessons and work methodologies to promote learning. Emergency remote learning led to adapting the teaching process to the new reality of living in confinement. In this sense, teachers and students needed to be trained in platforms and methodologies adjusted to e-learning.

The "training, better class time management, and pedagogical differentiation" [T196] allowed teachers to "knowledge of new digital approaches to capture student attention and interest" [T228]. It led students to have "autonomy of students in working with email, online meetings, sending photos, accessing the links " [T296]. Teachers also mentioned feeling the "increased parental involvement and accountability" [T245] during emergency remote learning and "greater accountability of students" [T461]. Also, they referred that "some students are more motivated because they feel more comfortable, less inhibited in distance learning, they only participate much more than before" [T234].

The collaborative work during the emergency remote learning contributed from teachers' perspective to the improvement of student learning outcomes. In addition, teachers admit that peer collaboration helped sustain teachers' professional development in technological resources and work dynamics adapted to e-learning. The "collaborative spirit among colleagues and sharing" [T47] was another aspect mentioned by the teachers that helped them since "the teachers created several support channels for the exchange of experiences" [T176].

In [Table 5], we present the teachers' perception of teachers asked about the positive aspects of emergency remote learning:

**Table 5**: Categories of analysis from teachers' responses about positive aspects about ERL.

| Dimension | Teacher |
|---|---|
| Positive aspects about emergency remote learning | "It is a challenging experience for teachers, students, and parents" [T12].<br>"I have learned a lot, but I work even harder" [T70].<br>"Innovation! Diversified strategies! Increased digital literacy for students and teachers" [T216].<br>"Process more focused on pedagogical differentiation, on the student, on learning" [T4].<br>"Students with great motivation " [T20].<br>"The possibility of carrying out tasks in deferred time" [T37].<br>"The collaborative spirit among colleagues and sharing" [T47].<br>"It exceeded my expectations with regard to the attitude of the students, the degree of attention they dedicate to the class and to participation" [T65].<br>"Closer connection with parents" [T74].<br>"Stimulation of the need to think outside the box, do things differently, produce new activities that bring us closer to a hybrid teaching" [T90].<br>"Create autonomy and responsibility in students" [T129].<br>"Students work more autonomously, they have to organize themselves" [T137].<br>"Being able to support a student individually" [T151].<br>"There is no action, no side conversations, allowing time savings, and a greater number of students to intervene/participate in classes" [T169].<br>"Teachers have created multiple support channels for exchanging experiences" [T176].<br>"It has allowed us to see education from a different perspective, challenging us to reflect on practices that were established and outdated" [T187].<br>"Training, better class time management and pedagogical differentiation" [T196].<br>"Ability to reinvent being a teacher to maintain an effective Teacher-Student relationship promoting autonomy, creativity and emotions" [T204].<br>"Digital training for teachers and students" [T211].<br>"It was the use of new technologies by students and educational guardians. Students managed to adapt and greatly improved their performance" [T214].<br>"Knowledge of new digital approaches to capture student attention and interest" [T228].<br>"Some students are more motivated because they feel more comfortable, less inhibited in distance learning, so they participate much more than before" [T234].<br>"Increased parental involvement and accountability" [T245].<br>"Online training, support, and sharing among schoolmates and on social networks" (T276).<br>"Autonomy of students in working with email, meet, sending photos" (T296)<br>"Remote learning allows for new technological learning and greater diversity of strategies to reach students. It is the reinvention of teaching" (T302).<br>"Improving students' digital skills" (T305).<br>"Constant challenge, valuing the work of teachers by families and collaborative work" (T316).<br>"Student autonomy and a gradual mastery of new technologies" (T319).<br>"Promoting Presentations Using Digital Tools" (T333).<br>"Domain of digital tools" (T348).<br>"Students' digital literacy has increased" (T377).<br>"I felt calmer in relation to covid 19" (T381, T601).<br>"Greater follow-up and involvement of educational guardians" (T425).<br>"Greater accountability of students" (T461).<br>"Possibility of leaving a video about the contents taught, later they can see it again and clear up their doubts" (T504).<br>"Getting out of the comfort zone, need to use platforms that were previously unknown" (T529).<br>"The possibility of giving immediate feedback to the student and being able to accompany the student in a more individualized way, but expense of my time" (T537).<br>"Personalizing learning" (T574). |

| | |
|---|---|
| | "Improving the digital literacy of all and the autonomy and responsibility of students" (T592). "Increasing students' digital literacy, diversification of work tools" (T635). "Excellent project work opportunity" (T636). "Development of students' autonomy and creativity" (T684, T974). "Students manage their time better, promote organization and autonomy in learning" (T787). "Greater tranquillity at work and better time management" (T819). "Increased participation by some students" (T914). |

We present the teachers' perception of teachers asked about the negative aspects of emergency remote learning in the next [Table 6]:

**Table 6**: Categories of analysis from teachers' responses about negative aspects about ERL

| Dimension | Teacher |
|---|---|
| Negative aspects about emergency remote learning | "Students with few routines in the context of autonomous and teamwork" [T20]. "Impotence to individualize teaching and help students who need more guidance. Impotence to overcome difficulties with network cuts, mine, and the students. Limitation of manual tasks. Limitation of time in front of the screen, mine and the students" [T28]. "The great appreciation of mandatory synchronous times" [T37]. "Lack of digital equipment in some students. Difficulty in supporting students on the part of guardians (lack of digital skills)" [T65]. "Working 12 or more hours a day" [T76]. "Lack of materialization with abstract content materials" [T88]. "Connection problems" [T89, T859]. "Lack of training for most teachers. Insufficient digital skills on the part of students" [P90]. "Internet failures and digital illiteracy of guardians" [T91]. "Lack of resources and technological knowledge of families" [T93]. "Lack of sharing activities, experiences from and with colleagues!" [T129] "The fact that some students have someone to carry out their work" [T137]. "Little digital literature for parents. Little autonomy for students" [T140]. "Number of daily working hours" [T141]. "Students without computer resources and without internet" [T150]. "Lack of Technological Means for Everyone at Home" [T165]. "Lack of guidelines, lack of support from the Directorates" [T176]. "The lack of IT equipment for E@D" [T179]. "Presence and interference of parents in classes, the difficulties for students with measures to support inclusive learning are accentuated" [T433]. "The planning of appealing tasks and the consequent creation of suitable materials, the looking for solutions, the attempt at training (technological and pedagogical) takes too long" [T492]. "Little respect from family members for online classes" [T408]. "The lack of technological equipment and Internet network of some students" [T423]. "Too much time in front of the screens with a permanent feeling that the work is not paying off" [T498]. "Managing the short Synchronous class time, lack of interest by some students and guardians in monitoring students, the ease of colluding with students' "builds", the lack of materials, but making good use of them. Students do not know, working with digital tools" [T527]. "The biggest difficulty I feel is not being able to reach everyone in the same way, whether due to lack of equipment, or lack of quality on the net or lack of ability to deal with the tools they have at their disposal. Many are experts at playing, but they don't know how to make a word document" [T537]. "Difficulties in creating credible evaluation moments" [T572]. Difficulty in creating group dynamics among students" [T606]. "Lack of preparation of the entire educational context does not allow for an implementation of E@D even as an emergency" [T636]. "Excess of computer hours; inability to provide differentiated attention to students; lack of rest and permanent stress to prepare digital materials to support classes" [T678]. "Lack of equipment, difficulty in managing task follow-up, in the case of families in telecommuting, with student children... above all emotional wear..." [T718]. "Lack of equipment and internet network for students" [T728]. |

| | "Lack of training to know how to handle platforms more rigorously" [T735]. "Students with different rhythms end up suffering more because we are not by their side to guide them and help them perform the exercises" [T761]. "Lack of training/lack of experience" [T780]. "There are no efficient technical conditions for this teaching to work. Not even the students who are following this E@D at school have the net and computer conditions to work in full" [T897]. "Social inequality is one of the biggest limitations in distance learning" [T964]. |
|---|---|

As the principal negative aspects of emergency remote learning, teachers mentioned the lack of time to prepare classes, the lack of access to equipment or internet connectivity, the lack of training, and the difficulty in evaluating students during emergency remote learning. The "lack of digital equipment in some students" [T65] and "connection problems" [T89, T859] are problems presented by the teachers for the "difficulty in supporting students on the part of guardians (lack of digital skills)" [T65]. The "lack of training for most teachers" [P90], the "digital illiteracy of guardians" [T91], the "lack of sharing activities, experiences from and with colleagues" [T129], plus the "insufficient digital skills on the part of students" [P90] are also difficulties pointed out by teachers in emergency remote learning.

Students' autonomy is essential for the school period and a necessary competence for their professional future. Unfortunately, one of the difficulties presented by the teachers in emergency remote learning was the lack of autonomy of their students that would allow them to solve problems autonomously, be proactive to study and have emotional independence. The lack of "routines in the context of autonomous and teamwork" [T20] of students and "impotence to individualize teaching and help students who need more guidance" [T28] worried teachers. The "presence and interference of parents in classes, the difficulties for students with measures to support including learning are accentuated" [T433], "the fact that some students have someone to do their work" [T137], and "little respect from family members for online classes" [T408], led to "social inequality" [T964] and "difficulties in creating credible evaluation moments" [T572]. The fatigue is associated with the "number of daily working hours" [T141], the "too much time in front of the screens with a permanent feeling that the work is not paying off" [T498], and "lack of guidelines, lack of support from the directors" [T176] created disorientation in teachers. They state that "the planning of appealing tasks and the consequent creation of suitable materials, the looking for solutions takes too long" [T492].

## DISCUSSION

The findings of this study are of great importance because there is a lack of previous research regarding this area and how Portuguese schools engaged students during the COVID-19 pandemic. Data analysis showed that the remote learning during the COVID-19 pandemic challenged the school population to have essential technologies Infrastructure to roll out remote learning effectively. The transformation in the education sector during the COVID-19 pandemic was a transition phase where teachers became YouTubers recording video lessons and learned to use different digital tools to support their classes. The virtualization of educational systems during the COVID-19 pandemic led to pedagogical models and practices that the teacher habitually used, which shows the teacher to assume new ones (Moreira, et all., 2020). About the steps to follow in online courses, Lencastre, Ilin, Bronze, Francica and Milios (2020), state that it is essential to have the curriculum as modules where each of these modules will contain a brief presentation, an activity, and a quiz. Some teachers already used various technological resources in their classes, but most were not used by them. These results are in line with those found by Marek, Chew, and Wu (2021). More than half of teachers have never incorporated technology beyond the basics of PowerPoint slides or discipline-specific hardware/software in their pedagogical practice.

On the other hand, the remaining teachers reported the use of various online platforms such as Google Meet, Facebook groups, Zoom, Kahoot, Microsoft Teams, and Edpuzzle, showing a great inequality in teachers' habits. As a result, teachers and students had to deal with remoteness and isolation and changes to virtual learning (Green, Burrow & Carvalho, 2020). In general, the technologies used by teachers were utilized from a purely instrumental perspective, reducing methodologies and practices to purely transmissive teaching (Moreira, Henriques & Barros, 2020).

In emergency remote learning, teachers felt calmer because they felt safe from getting the virus. Our results are in line with the results obtained by Onyefulu (2021). According to this author, during the emergency remote learning, teachers did not need to travel to schools; they are not physically with students and therefore feel protected against the covid-19 virus.

With the transition between face-to-face teaching and distance learning modalities, the teachers felt a significant workload. They, therefore, felt exhausted with a lack of motivation to develop their profession. Furthermore, they felt disoriented with the introduction of new technologies to them for video calls and remote monitorization of students. These results are in line with the results of Grren, Burrow and Carvalho (2020), as according to these authors, the abrupt transition from face-to-face teaching to the online mode introduced new tools into the routine of teachers, adding difficulties about internet access and the use of these new pedagogical resources.

During emergency remote learning, several challenges were posed to teachers, including lack of collaborative planning, not being part of the decision-making process, and lack of clear guidelines on how to work together (Onyefulu, 2021). Teachers felt that they worked much more during the emergency remote teaching period to prepare and implement classes than they did in face-to-face teaching. These results agree with those found by Marek, Chew, and Wu (2021), who in their study explored the experiences of higher education faculty that converted classes to distance learning during the COVID-19 pandemic; these authors found that most respondents experienced much higher workloads and the stress than in face-to-face classes. Teachers consider that emergency remote learning was "a challenging experience for teachers, students and parents" (T12) which "deeps inequalities and difficulties" (T88, P243, P366) because it "does not affect the learning of a large part of the students" (T91). In remote emergency learning, there is a physical classroom to provide students with information and guidance usually offered at the beginning of a class, which is why it is essential to draw up a plan where students can consult all the information and advice necessary to follow online classes (Monteiro, Moreira & Lencastre, 2015). Students must participate (and actively engage) in distance learning during the pandemic period (Cicha, Rizun, Rutecka & Strzelecki, 2021).

According to Cicha, Rizun, Rutecka and Strzelecki (2021), students already have digital skills that allow them to monitor distance learning. However, our teachers reported technical difficulties their by students. They report that the lack of training and the constant need to use digital resources led to "improving students' digital skills" (T305). However, teachers admitted that emergency remote learning had positive aspects. They said that it was "an excellent opportunity for the 21st-century school" (T316) and hope that in the "post-pandemic period, there can be a real transition to the digital, without making a clean sheet of all the investment made" (T177). They recall the fact that it is "extremely tiring for students and teachers for the number of hours they are in front of a computer". However, they recognize that the emergency remote teaching period had positive aspects such as the development of the "digital literature of teachers and students" (T97, T216) and that "it will have a strong impact on pedagogical transformation" (T801). However, they also consider that it would be more effective if "all teachers were trained to work with digital platforms and tools to create dynamic and interactive lessons and if all students had access to technological resources" (T674). They claimed to be a process "more focused on pedagogical differentiation, on the student, on learning" (T4), allowing students to "perform tasks in a deferred time" (T37), allowing them to establish a "closer connection with parents" (T74) and to "create autonomy and responsibility in students" (T129, T186). Our results are like those found by Khlaif, Salha, and Kouraichi (2021). According to these authors, most teachers participating in their study reported that online teaching, learning increased digital inequality and threatened their digital privacy negatively influenced their involvement in own professional activity. What affected teachers' professional activity (Khlaif, Salha & Kouraichi, 2021).

Adopting an online learning environment is not just a technical issue for the interviewed teachers; it is a pedagogical and instructional challenge. Emergency remote learning affected the structuring of teaching and learning practices by requiring students to engage with teachers remotely using technology, even with lack of connectivity, and in some cases, lack of both connectivity and digital literacy of teachers and students (Green, Burrow & Carvalho, 2020). According to Khlaif, Salha, and Kouraichi (2021), the attitude of teachers and the quality of content are factors that influence student engagement.

## CONCLUSIONS

The process worked very well for some of these teachers, and we can say that they were autonomous, self-motivated, and responsible. However, the findings also show that a part of the teachers felt difficulties in connectivity, lack of technological resources, and lack of training that would allow them to develop technology-enhanced learning. The use of technology during remote learning has become a potent force in transforming the implemented educational landscape. However, teachers recognize that they need to know effective methods to apply this model online or hybrid and coordinate for a more effective teaching practice with technologies. The teachers' point of view reinforces the importance of continuous training in using an online or hybrid teaching model. This highlights the importance of the teachers' involvement to promote the quality of remote learning. It was fascinating to verify that teachers saw emergency remote learning as an opportunity to evolve pedagogically

and digital skills. According to the results, aspects such as the teacher-student relationship, pedagogical differentiation and collaboration between teachers were already necessary, but emergency remote learning gave them more visibility.

There are academic and social implications that can be taken out of this study. From an academic point of view, our results indicate that remote learning programs can use students' learning effectively through emergency remote teaching. However, it is noteworthy that teachers report a greater personal effort to implement this emergency remote teaching. From a social point of view, emergency remote teaching can make it possible to maintain social distancing measures and at the same time, allowed to maintain online contact between teachers and students to continue teaching and learning work outside the school's physical space. So, this study pointed out the effectiveness of emergency remote learning.

We seek to reflect on teachers' perspectives to help decision making, and findings suggest that part of the teachers are receptive to remote learning; however, further research is needed to study the pedagogical acceptance of distance learning by teachers in a post-pandemic COVID-19 environment.

As a final remark, it seems relevant to us in future studies to understand how the experience through the emergency remote learning, the use with digital tools, and differentiated teaching methodologies changed teachers' practices in a post-pandemic COVID-19 environment.

## ACKNOWLEDGEMENTS

## LIMITATIONS OF THE STUDY

The study analyses a limited sample of teachers. So, it offers insights for further research, but it cannot propose generalized conclusions. Data collection occurred during the emergency times of covid-19 pandemic, the, which could have affected teacher's responses and emotions.

## REFERENCES

Cicha, K., Rizun, M., Rutecka, P., & Strzelecki, A. (2021). COVID-19 and higher education: first-year students' expectations toward distance learning. *Sustainability*, 13(4), 1889.

Garrison, D. R. & Anderson, T. (2005). *El e-learning en el siglo XXI. Investigación y práctica*. Barcelona: Octaedro.

Green, J. K., Burrow, M. S., & Carvalho, L. (2020). Designing for transition: supporting teachers and students cope with emergency remote education. *Postdigital Science and Education*, 2(3), 906-922.

Lee, O., & Campbell, T. (2020). What Science and STEM Teachers Can Learn from COVID-19: Harnessing Data Science and Computer Science through the Convergence of Multiple STEM Subjects. *Journal of Science Teacher Education*, 31(8), 932-944.

Lencastre, J. A., İlin, G., Bronze, J., Francica, M., & Milios, P. (2020). How to design and teach a blended course for hard-to-reach adult learners. *Journal of e-Learning and Higher Education*, Vol. 2020 (2020), Article ID 220154, 1-10. DOI: 10.5171/2020.220154

Khlaif, Z. N., Salha, S., & Kouraichi, B. (2021). Emergency remote learning during COVID-19 crisis: Students' engagement. *Education and information technologies*, 1-23.

Marek, M. W., Chew, C. S., & Wu, W. C. V. (2021). Teacher experiences in converting classes to distance learning in the COVID-19 pandemic. *International Journal of Distance Education Technologies* (IJDET), 19(1), 40-60. DOI: 10.4018/IJDET.20210101.oa3

Moreira, J. A., Henriques, S., & Barros, D. M. V. (2020). Transitando de um ensino remoto emergencial para uma educação digital em rede, em tempos de pandemia. *Dialogia*, 351-364.

Onyefulu, C. (2021). Perceived Effectiveness of School Leadership in Emergency Remote Learning During the Coronavirus Pandemic. *In Emergency Remote Learning, Teaching and Leading: Global Perspectives*, 179-198.

Rosenberg, M. B. (2006). *Comunicação não-violenta: técnicas para aprimorar relacionamentos pessoais e profissionais*. Editora Agora.

# The Effects of Gamification Instruction on the Roles of Perceived Ease of Learning, Enjoyment, and Useful Knowledge toward Learning Attitude

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**Abstract**
This study has separated into two stages. In the first stage, we interview with nine students and discover three crucial elements, perceived ease of learning, enjoyment, and useful knowledge, which will affect students' learning attitude. Then we develop a series of gamification curricula for those learners. In the second stage, we adopt gamification instruction in this semester and intend to verify the changes in learning attitude. To assess the effects of perceived ease of learning, enjoyment, and useful knowledge, toward learning attitude and the changes in learning attitude, an experimental design is employed in gamification curricula of a primary school in Taiwan. From the experimental results, we find out that perceived ease of learning, enjoyment, and useful knowledge all have positive effects on learning attitude. Besides, we have also verified the significantly positive effects of the gamification curricula in learning attitude in comparison with conventional curricula. Two contributions are in this study. First, perceived ease of learning, enjoyment, useful knowledge and two concepts of adopting mobile devices and competition strategy are the prerequisite elements while developing curricula. Second, students gain functional and behavioral competencies and utilize them into practical field.
**Keywords:** gamification instruction, learning attitude, perceived ease of learning, perceived enjoyment, perceived useful knowledge

## INTRODUCTION

Alternative education, innovative pedagogy practice in Jenaplan school, plays an important factor such as dialogue, play, work, and celebration effects on students' learning attitude. The concept of alternative education may rely on supports of two key pillars, Game-based learning incorporating social learning theory. The two theories mainly intend to provide students interested and exciting curricula for drawing pupils' attentions in learning. However, owing to the culture differences, Asia education aims at competition until now. Naonaka and Toyama (2007) indicated that competition strategy provides external stimulations to learners as well as affects their efficiency of knowledge acquisition. Burguillo (2010) defined that competitive stance might stimulate peers' wills to receive challenges of learning tasks. Via conquering the difficulties, learners may improve their performance and motivation. Additionally, students who were born in cyber era are familiar with computer interfaces like on-line games and social media. The vivid interactive interfaces have captured the eyes of those learners from new generation. In order to tackle the challenges, Ubiquitous learning is introduced in education domain. It is considered a crucial element to inspire apprentices on learning and enhance learner participation in educational settings (McLoughlin & Lee, 2010). Therefore, innovative curriculum design should comprise of the elements above mentioned.

However, presently most teachers in the primary school only lecture students in the classroom by reading those cold lines words by words from textbooks. Comparing to the vivid interactions with network games, those learners show less interested in learning in school study. Even though some teachers intend to improve students' learning attitude via arranging field trip programs such as visiting historic constructions and appreciating natural beauty in the National Park, it is still difficult to inspire their passion in learning (C. P. Chen, Shih, & Ma, 2014).

Currently, the advancement of integrated technologies in computer, telecommunication, and internet content have provided students great opportunities to explore knowledge Treasure Island in cyber world. Owing to a variety of information hidden in the network, we have to utilize the advantages of high-tech devices such as smartphone and tablet as teaching aids for ubiquitous learning (Klopfer, Sheldon, Perry, & Chen, 2012). Therefore, we plan to design interactive curricula with game attributes in both real and virtual worlds. First, we invite students to co-design new curricula. With students' involvement in designing curricula, they might show great interesting in learning. Second, utilizing mobile devices as teaching aids. Students can immediately acquire the latest information like historic constructions or natural habitat of black-faced spoonbill by simply typing the key words or scanning the QR code. Finally, the element of competitive strategy (Fu, Wu, & Ho, 2009) was incorporating in the new curricula is proven as an effective and efficient method to encourage students in learning. In order to improve

students' learning attitudes and satisfaction, systematic gamification curricula with features of pleasurable activities, ease of learning, useful knowledge, mobile devices, and competition strategy are desperately to be developed.

In this study, we plan to examine research issues. Firstly, we intend to explore the relationship of perceived ease of learning, enjoyment, and useful knowledge toward learning attitude via students' perspectives of the new curricula. Secondly, we focus on examining the changes of learning attitude and satisfaction between gamification and conventional curricula. Finally, the research questions are as follows:

1. What is the effect of gamification curricula in perceived ease of learning to attitude?
2. What is the effect of gamification curricula in perceived enjoyment to attitude?
3. What is the effect of gamification curricula in perceive useful knowledge to attitude?
4. What is the effect of the gamification curricula in learning attitude in comparison with conventional curricula?

## LITERATURE REVIEW
### Theories & Gamification Curriculum Acceptance Model
Social learning theory puts great efforts on observing the connections of the behaviors, attitudes, and emotional reactions of others via continuous reciprocal interaction (Bandura, 1977). Interactive curriculum design such as game-based learning, which is served great influence on cognition development, motivation improvement, and decision making, facilitates students to gain attention, memory and motivation through intensive interactions. (Gee, 2003). From the perspective of emotion, the curricula of game-based learning should include agents in enjoyment, excitement, frustration, and achievement (Lazzaro, 2004) through active engagement in collaboration (Huang, Yeh, Li, & Chang, 2010). Some studies stated that motivation comprises of intrinsic and extrinsic motivation and perceived usefulness belongs to extrinsic motivation (Davis, Bagozzi, & Warshaw, 1992). Other studies indicated the positive relationship between perceived of usefulness and ease of use toward attitude and intention (Venkatesh & Morris, 2000). Still others suggested that enjoyment was a crucial element toward attitude and intention (Grant, 1991). More importantly, design a portable machine and virtual content platform with game attributes, Ubiquitous learning integrating the functions of mobile device and wireless technology (Hwang, Tsai, & Yang, 2008), to provide students a convenient mobile learning environment anywhere and anytime on formal education context (Liu & Hwang, 2009). Furthermore, we also invite scholars, experienced teachers, and local elders as external resources (Enkel, Gassmann, & Chesbrough, 2009) to develop a framework of local culture courses. Moreover, students are empowered to co-design illustrations, audio books, and activities. With opportunities to design curricula with teachers, students have shown greater learning attitude (Dickey, 2005). In this study, we adopt social learning theory to develop new curricula with game attributes, perceived ease of use, enjoyment, usefulness. We reason that the gamification curricula might improve students' learning attitude and expect those attributes have connections with learning attitude corresponding to technology Acceptance Model (Davis, 1989). In the following pages, we intend to discuss attitude, perceived ease of learning, enjoyment, useful knowledge and satisfaction.

### Attitude
Attitude was defined unconsciously natural responses (Benavides-Velasco & Quintana-Garcia, 2008). Previous studies suggested that both usefulness and ease of use had positive influence on attitude (Davis et al., 1992). Other study stated the perceived ease of learning also acts as key element affecting learning attitude (Lin & Chuang, 2017). Besides, learning desire delivered positive influence on learning attitude (B. H. Chen, Hsu, & Chen, 2012). According to current studies, we understand prior studies that had aimed at the fields of information technology for young generation. To our acknowledgement, few studies integrate curriculum design, gamification, mobile devices, and competitive strategy to lecture young learners. Hence, game attributes such as ease of use, enjoyable environment, and abundant built-in textbook knowledge are designed in the new curricula to satisfy young students in learning. We expect those young learners might have increased their learning attitude via these new curricula.

### Perceived ease of learning
Davis (1989), Venkatesh (1996), and Al-Gahtani and King (1999) stated that perceived ease of use affected on both attitude and intention. Some studies had been proven the connections between perceived ease of use and attitude in both mobile medical (Wu & Wang, 2005) and educational domains (Lin & Chuang, 2017). Other studies in mobile technology indicated that perceived usefulness and ease of use deliver positive effects on attitude and intention (Lu, Yao, & Yu, 2005). Hence, we plan to introduce mobile devices and gamification concepts to design ease of learning curricula like ubiquitous learning incorporating competitive strategy for guiding students to acquire prerequisite knowledge as well as to increase their learning attitude.
### Perceived enjoyment

Enjoyment had been defined to deliver hedonic experiences (Csikszentmihalyi, 1975). Playful, fun, and enjoyment were also suggested to have positive effects on attitude (Davis et al., 1992; Nysveen, Pedersen, & Thorbjørnsen, 2005). Previous research indicated that the lively on-line interactive interface made young buyers enjoy the experiences of on-line purchasing (Wan, 2000). On the other hand, enjoyable environment provide gamers a comfortable place for social interaction (Tseng, 2001). Additionally, Lin and Chuang (2017) had proven the relationships between perceived enjoyment and learning attitude. Owing to the mentioned above, we intend to develop interested curricula like routes of field trips to make students closely experience the beauty of nature as well as to have further understanding of culture of Anping. We hope the innovative curricula create a comfortable learning environment for students as well as better their learning attitudes.

*Perceived useful knowledge*
Davis (1989) regarded perceived usefulness is the degree of a personal belief in adopting particular system to deliver better performance on their jobs. Pfeffer (1982) indicated that providing people incentive such as state-of-art knowledge acquisition, promotions, and bonuses will deliver good performance. Additionally, Utilizing the knowledge related to online airline ticket purchasing system will make people to get tickets easily (Renny, Guritno, & Siringoringo, 2013). Lin and Chuang (2017) addressed that applying the useful knowledge gained in classroom learning assisted students to accomplish the assigned projects. Therefore, gaining useful knowledge acts as a crucial element of improvement in learning attitude because it can solve many challenges in our everyday life. We anticipate that students might improve their learning attitude via the integrated curricula.

**METHODOLOGY**
*Case Introduction*
The faculties of SI-Men elementary school plans to investigate what determinant elements will influence students' perspectives toward learning attitude. In order to provide learners a comfortable learning environment and to acquire useful knowledge, we design new curricula in this study and hope the ones will make students feel comfortable and enjoyable in learning during the era of primary school. In 2014, the participating faculties had won golden medal of Program for Promoting Teaching Excellent.

*Gamification curriculum development*
With a close observation on learning attitude of young students in primary school, we find that students show less interested in learning. However, on the purpose of awaking and increasing their learning attitude, teachers begin to work with students and develop seven interesting routes of field trips; Furthermore, mobile learning and competitive strategy in gamification are adopted in new curricula. The former supports young learners to acquire instant knowledge without location and time limits; however, the latter stimulates students with stronger desires to win over others. For example, demand students to be narrators and in different tourist sites. When tourists satisfy with your service, you get one point. Finally, the team with more points wins the game. Those are the key elements to make students enjoy learning. In conclusions, we expect that the package of the innovative curricula increases students' learning attitude and satisfaction in the real world.

An example of new curriculum development in described as follows: Innovative curriculum includes six main parts, design concept, teaching materials, teaching strategy, measurements, teaching processes and challenges. The following pages will describe the detail information of this curriculum. The new curriculum names walking with Anping sword-lion and the design concept of this curriculum aims at sharing the knowledge of sword-lion with America and Australia sister schools. Teaching material, textbook, is collaboratively written and drawn by teachers and students. Teaching strategies comprises of ubiquitous learning, teamwork and sharing the knowledge of sword-lion with sister school's students via social media. Measurements of students' performance are graded by mobile device utilization, teamwork, film shooting and building a website. Teaching processes include field study, team observation, information searching, making films and presentation. Finally, translation and sharing the knowledge of sword-lion history with foreign students are challenges for primary school students. The detail information is listed on table 1.

*Research Design*
Figure 1 depicted the experimental processes of this research. We first interviewed with nine students and found out three critical factors to influence students' learning attitude shown on table 2. Then, we applied those key factors to technology acceptance model in this study. In the second stage, we demand those students who received conventional curriculum lecturing to take pre-test for analyzing their learning attitude. Then, the students had been arranged to receive gamification curricula of lecturing for three months. After completing the gamification courses, students were asked to fill out post-questionnaire for measuring the possible change in their learning attitude and satisfaction.

Table 1. An example of Curriculum design of Lion-Sword

| Curriculum design | Descriptions |
|---|---|
| Design concept | The design concept intends to support students to gain heterogeneous competencies such as observation, information collection, and oral presentation via the curriculum of Sword-Lion. |
| Teaching materials | **The textbook of Sword-lion**: Written & drawn by teachers and students<br>**Mobile device (Tablet)**: Engaging in ubiquitous learning |
| Teaching strategy | **Ubiquitous learning**: Use tablets to research information of sword-lion.<br>**Teamwork**: Gather and share information for presentation. |
| Measurements | ● Skills of using mobile device<br>● Efforts in teamwork<br>● Film-shooting<br>● Presentation<br>● Building up a website. |
| Teaching processes | **Utilizing tablets** to record information of sword-lion during field study<br>**Teamwork**: Observation training and improvements of interpersonal skills<br>**Presentation** for students in foreign countries: Language and oral expression. |
| Challenges & Solutions | **Challenges**: Translation problems<br>**Solutions**: Each student delivers his part of presentation in English. |
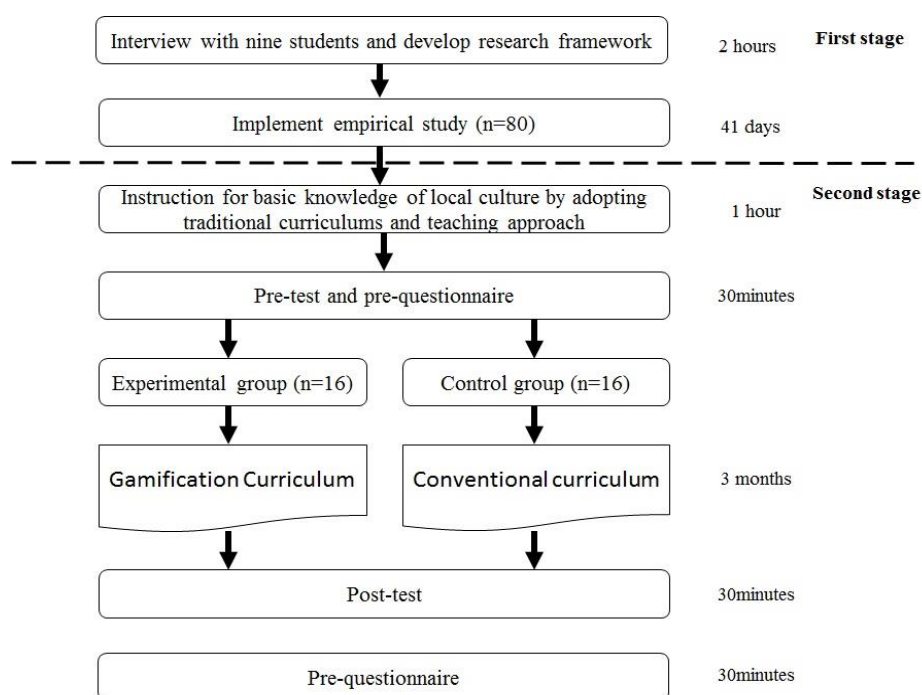


Figure1. Experimental procedure

Table 2. Background of nine students (n=9)

| NO. | Gender | Grade | Age |
|---|---|---|---|
| ST.1 | Female | 6 | 12 |
| ST.2 | Female | 6 | 12 |
| ST.3 | Male | 6 | 12 |
| ST.4 | Male | 6 | 12 |
| ST.5 | Female | 6 | 12 |
| ST.6 | Female | 6 | 12 |
| ST.7 | Male | 6 | 12 |
| ST.8 | Male | 6 | 12 |
| ST.9 | Female | 6 | 12 |

*Interview results*

The purpose of this interview aims at exploring the key elements of adopting innovative lecturing from young learners' perspectives. This interview included nine sixth grade students. After interviews with nine students, we conclude four scopes, perceived ease of learning, enjoyment, useful knowledge, and attitude in this study. The results indicate that seven students (77%) agree with perceived ease of learning in the new curricula. Nine students (100%) show enjoyable feeling while lecturing. Furthermore, nine students (100%) express that they prefer to acquire useful knowledge. Finally, there are seven students (77%) demonstrate that interesting curricula affect their learning attitudes. The detail information is shown on both tables 3 and 4 respectively. Therefore, empirical research was developed.

Table 3. The results of constructs while interviewing with students (n=9)

| Scope | Issues | Users' experience |
|---|---|---|
| **Ease of learning** | Simple and easy | 7/9 |
| **Enjoyment** | Enjoyable course | 9/9 |
| **Knowledge usefulness** | Heterogeneous competence | 9/9 |
| **Attitude** | Accept new teaching approach | 7/9 |

Table 4. The detail information of interviewing with nine students (n=9)

| Scope | No. | Content |
|---|---|---|
| **Ease of learning** | ST. 1,5,8 | Knowledge taught by this teaching approach is easy for me. |
| | ST. 2,3,5,9 | The interface is simple and easy to understand. |
| | ST. 3,4,8 | This platform provides leaners an easy way to access. |
| **Enjoyment** | ST. 1,2,4 | I feel interested in this teaching approach. |
| | ST. 3,4,5,7,8 | New teaching approach is fun; besides, I also learn heterogeneous |
| | ST. 6,7,8,9 | The new teaching approach makes me feel comfortable in learning. |
| | ST. 2,3,5,8 | When I am asked to answer questions, I feel pleasant. |
| **Knowledge usefulness** | ST. 1,2,5,7 | I learn responsible attitude. |
| | ST. 6,8,9 | I begin to concern local culture. |
| | ST. 3,4,5,6,7 | I improve my oral expressions. |
| | ST. 1,2,3,4,5,6,7,8,9 | I learn the ability to use mobile technology. |
| | ST. 2,5,6,8 | I develop ability in independent thinking and problem solving. |
| | ST. 1,3,4,6,7,8,9 | My attitude becomes more optimistic when facing challenges |
| **Attitude** | ST. 1,3,4,5 | I will suggest this course to my classmates. |
| | ST. 1,2,4,6,7 | I feel enjoyable and I plan to get better grades. |
| | ST. 2,6.7 | I want to introduce this course to other teaches. |
| | ST. 1,3,4,5 | I will pay attention on relative information of this course. |

*Research Model*

Four major constructs of model were delivered by interviewing with nine students in this study (see figure 2). Considering developing the Gamification Curriculum Acceptance Model, we redefined those mentioned factors into perceived ease of learning, enjoyment, useful knowledge and learning attitude.
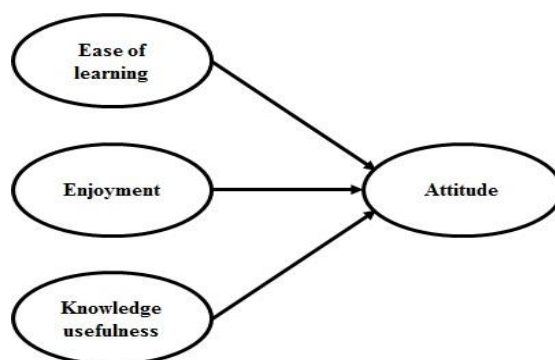


Figure2. Research framework

*Definition and measurement of constructs*

Four items in perceived ease of use and five items in perceived knowledge usefulness (Davis, 1989), enjoyment (Nysveen et al., 2005), and attitude (Davis et al., 1992) are modified and developed respectively. Operational definitions are shown on table 5.

Table 5. Operational Definitions of Constructs

| Operational Definitions |
|---|
| **Perceived ease of learning:** |
| EOL1. It is easy to learn the knowledge taught by teacher in class. |
| EOL2. Interactive teaching approach is flexible to students. |
| EOL3. It is easy to make students involve in scenarios during lecturing. |
| EOL4. The purpose of lecturing knowledge to students is clear. |
| **Enjoyment Sources:** |
| EJY1. I think learning should make students feel enjoyable. |
| EJY2. I think learning should make students feel excited. |
| EJY3. I think learning should make students feel pleasant. |
| EJY4. I think learning should make students feel interested. |
| EJY5. I think learning should deliver students joyful hours. |
| **Knowledge usefulness:** |
| KU1. The knowledge taught in this innovative curriculum is useful to students. |
| KU 2. The knowledge taught in this new curriculum can be apply to real world. |
| KU 3. The new curriculum helps students acquire knowledge effectively and efficiently. |
| KU 4. The new curriculum is innovative. |
| KU 5. The learned knowledge can be applied to our daily lives. |
| **Learning Attitude:** |
| ATT1. I think innovative teaching curricula are attractive. |
| ATT2. I have positive attitude toward innovative teaching curricula. |
| ATT3. I will particularly aware of information about innovative teaching curricula. |
| ATT4. I will recommend others about this innovative teaching approach. |
| ATT5. I think that innovative teaching curricula are worth to take. |

*Sample and procedure*

Our sampling of research model focused on eighty students studying in grade four, five, and six in Si-Men elementary school. The problem of common method variance is considered via three measurements. First, we hid reverse questions in the questionnaires. Second, two stages of filling out questionnaires were designed in the middle of semester and in the end of semester respectively. Finally, verify discriminant validity. Polite study, only 30 responses, examines consistency, semantic, and syntax. The survey took place from September 1st. to October 11th in 2014. 100 percentage of response rate. In the second stage, the 16 participants, average 12 years old, were sixth grade students taught by the same teacher. We plan to examine the selected students' learning attitude via different teaching approaches. Figure 3 shows students' pictures in gamification curricula.



| | | |
|---|---|---|
| *Discussion with scholars* | *Co-design textbook* | *Lecturing* |
| *Teamwork* | *E-learning* | *Field trip* |

| Taijiang National Park | OP sailboat | Narrators |
| Plays | Digital game | Epals platform |

Figure3. Students' pictures in gamification curricula

## ANALYSIS & RESULTS

*Validity and Reliability*

Some criteria for validity and reliability are given as follows: KMO >0.5, communality >0.5, eigenvalue >1, factor loading >0.6, Cronbach's alpha >0.7 and item-total correlation >0.6. The factor loadings for three items of Attitude construct were 0.90, 0.69, and 0.88 ($\alpha$=0.85) fitting requirements. Independent variables: three items of factor loadings in perceived ease of learning construct were 0.85, 0.86, and 0.81 ($\alpha$=0.88). Three items of Enjoyment construct fitted requirement with factor loadings 0.87, 0.60, and 0.72 ($\alpha$=0.77). Furthermore, four items in useful knowledge were preserved with factor loadings among 0.70, 0.91, 0.76, and 0.75 ($\alpha$=0.84) shown on Table 6. Then, the values of CMIN/DF=1.43, NFI=0.88, RFI=0.84, IFI=0.95, TLI=0.94, CFI=0.95, and RMSEA=0.07 presented a good model fit. The convergent validity is examined by composite reliability and average variance extracted, which should be higher than 0.6 and 0.5, respectively (Fornell, 1981). The values of composite reliability are 0.87, 0.77, 0.86, and 0.86. Besides, figures of AVE were 0.70, 0.54, 0.61, and 0.68. The diagonal values were 0.84, 0.73, 0.78, and 0.82 all higher than the correlation coefficients, as shown on Table 7; thus the constructs showed good discriminant validity.

Table 6. Validity and Reliability

| Construct | Items | Contents | Factor Loading | α | CR | AVE |
|---|---|---|---|---|---|---|
| **Ease of learning** | POE1 | It is easy to learn the knowledge taught by teacher in class. | 0.85 | | | |
| | POE3 | It is easy to involve in scenarios during lecturing. | 0.86 | 0.88 | 0.87 | 0.70 |
| | POE4 | The purpose of lecturing knowledge to students is clear. | 0.81 | | | |
| **Enjoyment** | EJY1 | I think learning should make students feel enjoyable. | 0.87 | | | |
| | EJY2 | I think learning should make students feel excited. | 0.60 | 0.77 | 0.77 | 0.54 |
| | EJY4. | I think learning should make students feel interested. | 0.72 | | | |
| **Knowledge usefulness** | KU1 | Knowledge in new curriculum is useful to students. | 0.70 | | | |
| | KU2 | Knowledge in new curriculum can be apply to real world. | 0.91 | | | |
| | KU3 | Curriculum helps learners acquire knowledge efficiently. | 0.76 | 0.84 | 0.86 | 0.61 |
| | KU4. | The new curriculum is innovative. | 0.75 | | | |
| **Learning Attitude** | ATT1 | I think innovative teaching curriculum are attractive. | 0.90 | | | |
| | ATT3 | I particularly aware of information about new curricula. | 0.69 | 0.85 | 0.86 | 0.68 |
| | ATT5 | I think the courses in new curriculum are worth to take. | 0.88 | | | |

Table 7. Discriminant Validity

|  | Ease of Use | Enjoyment | Knowledge usefulness | Attitude |
|---|---|---|---|---|
| **Ease of learning** | (0.84) |  |  |  |
| **Enjoyment** | 0.65** | (0.73) |  |  |
| **Knowledge usefulness** | 0.65** | 0.53** | (0.78) |  |
| **Attitude** | 0.76** | 0.68** | 0.66** | (0.82) |

*Analysis of learning attitude*
Table 8 shows the descriptive statistics and Independent-Sample T Test result of learning attitude. Both of the mean value and standard deviations in post-questionnaire were 5.97 and 1.06 for gamification curricula, and 5.07 and 0.78 for conventional curricula. From the Independent-Sample T Test result, significant effects are found in perspective taking (*t*=2.72, *p*<0.01). This suggests that gamification curricula could increase students' learning attitude more than conventional curricula.

Table 8. Descriptive data and t-test in learning attitude toward different curriculum

| Experiment design | N | Mean | SD | Std. error | t | Eta square |
|---|---|---|---|---|---|---|
| Conventional curriculum | 16 | 5.07 | 0.78 | 0.19 | 2.72** | 0.19 |
| Gamification curriculum | 16 | 5.97 | 1.06 | 0.26 |  |  |

*Results of the Research Model*
The VIF values were below 10 (Neter, Kutner, Nachtsheim, & W., 1996) which verified no issue of multi-collinearity in this research model. In addition, those figures showed good model fit of Structural Equation Models were as following: CMIN/DF=2.76, IFI=0.88, TLI=0.84, TLI=0.80, CFI=0.83. The results of the regressions were shown as follow: Firstly, perceived ease of use had significant influence on learning attitude ($\beta$=0.61，p＜0.001) so hypothesis 1 was supported. Secondly, perceived learning enjoyment had positive influence on attitude ($\beta$=0.55，p＜0.001); therefore, hypothesis 2 was supported. Finally, we also found out that knowledge usefulness had positive influence on Attitude ($\beta$=0.29，p＜0.01) and the results of research model was shown on figure 4. Finally, H1, H2, and H3 were all supported. Table 9 show the results of regressions.
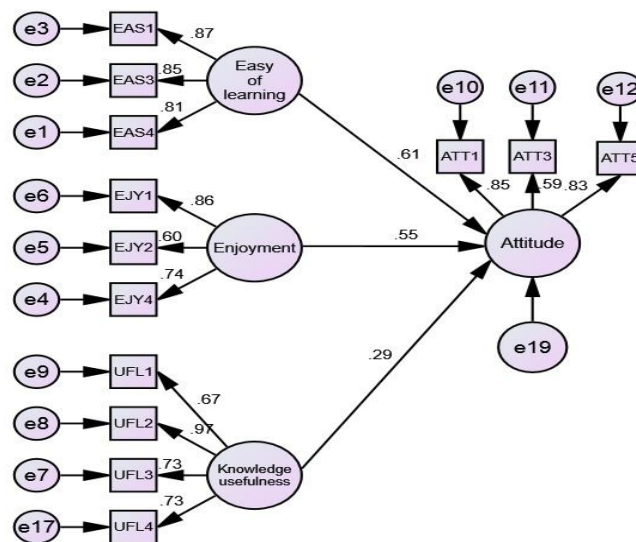


Figure 4. The results of framework

Table 9. Results of hypothesis

|  | Hypothesis | Results |
|---|---|---|
| H1 | Perceived ease of learning has positive influence on attitude | Supported |
| H2 | Perceived enjoyment has positive influence on attitude | Supported |
| H3 | Perceived useful knowledge has positive influence on attitude. | Supported |

## CONCLUSIONS & DISCUSSIONS

*The connections of research model*

Gamification instruction has changed the learning attitudes of students, who study in primary school. Three aspects will be discussed as follows: (A). perceived ease of learning and learning attitude, (B) perceived enjoyment and learning attitude, and (C) perceived useful knowledge and learning attitude. In the aspect A, the ease of learning curricula is design to make young learners gain knowledge easily in different courses. We expect the curricula will assist pupils to acquire new knowledge step by step in the classroom teaching as well as to improve their learning attitudes. The result is in line with previous study (Davis, 1989). In the aspect B, the curricula are comprised game and competition attributes. We anticipate students enjoy the learning atmosphere and obtain the knowledge comfortably in the classroom teaching in order to enhance students' learning attitudes. The outcome appears to be consistent with prior study (Davis et al., 1992; Nysveen et al., 2005). In the aspect C, students apply the learned knowledge to accomplish the assigned tasks via mobile device like tablet. The achievement of finishing assignment makes those learners feel the learned knowledge in the classroom teaching is useful. Thus, students increase their learning attitudes. The consequent corresponds with former study (Davis, 1989). In conclusions, we have proven that perceived ease of learning, enjoyment, and useful knowledge have positive and significant influence on learning attitudes. Furthermore, we also verified that gamification curricula could increase students' learning attitude more than conventional curricula.

*Integrated curriculum design and instruction*

From the experiment conducted in a primary school local culture course, it is verified that curricula with game attributes incorporating co-deign curriculum, mobile device, competition strategy, and trip studies enable to improve students' learning attitude. In this study, we have successfully proven that the elements of perceived ease of learning, enjoyment, useful knowledge do affect students' learning attitudes. In the following pages, we will have further discussions on increasing students' learning attitudes via four different teaching elements by the example of sword-lion curriculum.

The example of sword-lion curriculum is success of this program and it comprises four key components, co-designing a curriculum, ubiquitous learning, competition strategy, and outdoor activities. *In the perspective of co-design curricula*: Teachers invite students to co-design the textbook both in writing contents and drawing the illustrates. Teachers expect those participators to collect necessity information to complete the textbook via close observations on sword-lion in Anping during trip study. Additionally, introducing the sword-lion knowledge to foreign students in America and Australia strongly depends on the setting up of sound social platform and fluent language capability. The gained achievements improve students' learning attitudes. *In the perspective of ubiquitous learning*: Students were demanded to use mobile device to acquire related information of sword-lion such as stories and historic constructions while walking on the oldest street in Taiwan. Students via the learning processes not only improve the competencies of self-study and using of mobile deice, but also increase their learning attitudes well. *In the perspective of competition strategy*: Instructors host a competition for students who participating the Anping tour. Students were separated in several teams and which team uses less time to calculate the right number of sword-lion in Anping village is the winner. The strategy did inspire students' motivation. They showed great desires to win the game. Students in one particular team adopt the strategy of separating the village into four areas and each area is responsible by two participators. Through the proactive moves, we understand that competition strategy serves as an important role on enhancing students' learning attitudes. Finally, *in the perspective of trip studies*: Teachers ask students to pre-study related information of this particular curriculum. Owing to the preview and teachers' clear explanations, students are easier to immerge in this learning circumstance and to gain practical knowledge. In short, participating the innovative curricula not only makes students perceive ease of learning, perceive enjoyment, and gain useful knowledge, but also gain functional and behavioral competencies (shown on table 11) and improve their learning attitudes. The results suggest that the innovative curricula have great impact on students' learning attitudes (Hwang, Wu, & Chen, 2012).

In conclusions, three contributions are in this study. First, we develop interesting and interactive gamification curricula through social learning theory. Second, we have proven that perceived ease of learning, enjoyment and useful knowledge do affect students' learning attitudes. Third, students learn practical functional and behavioral competences and apply those competences to improve their daily life. Via the processes of developing gamification instruction, six crucial factors are found in this study.

(1)     Co-designing curriculum of game attributes with students.
(2)     The trend of future in interdisciplinary curriculum development.
(3)     Utilizing mobile devices as teaching aids.
(4)     Adopting tour studies to experience lives.
(5)     Improvements of interpersonal skills via teamwork.

(6)        Measure individual competences via multi-assessment.

Finally, we sincerely suggest teachers and researchers to take the six elements as references when developing innovative curricula.

*Implication*
To ensure the improvements of students' learning attitudes, it is important that instructions and curricula should be redesigned by adding game and competition attributes. Instructors must focus on the key ingredients of to increase learning attitudes. For example, lecturers should first invite students to co-design textbooks via gamification instruction. As such, innovative curricula comprising pedagogical information and measurement should be integrated effectively with teaching approaches. Because of these efforts, students will improve their learning attitudes in the future. This study presented empirical data comparing conventional and gamification instruction at Si-Men primary school.

*Limitation & future studies*
It should be noted that this study was a small-scale investigation on a project basis. The subjects of this study were elementary students in Taiwan. Cultural differences in terms of the curriculum design may have a potential impact learning attitude. Future research should be focused on training primary students to gain interdisciplinary competencies and apply the learned knowledge in the real-world practice. For example, it would be interesting to explore the connections of knowledge absorption capacity, listening and interdisciplinary competence acquisition via project-based learning.

Table 11. Acquiring functional and behavioral competences by adopting gamification curricula

| Si-Men Sailing King(Curriculums) | Measurement | Functional competence | | | | Behavioral competence | |
|---|---|---|---|---|---|---|---|
| ➤ Adventure of voyage | Drawing | ● | Imagination | ● | Oral expression | ◆ | Presentation skill |
| ➤ Yes! Captain | Puzzle & role play | ● | Art performance | ● | Teamwork | ◆ | Listening skill |
| ➤ Taiowan incident | Storytelling | ● | Independent thinking | ● | Writing skill | ◆ | Communicative skill |
| ➤ Sailing to dream world | Team work | ● | Computer skill | ● | Problem-solving | ◆ | Social interaction |
| ➤ Trading firms & tree house | Art performance/ narrating | ● | Oral expression | ● | Language (Taiwanese) | ◆ | Listening skill |
| ➤ Visiting Wax Statues | Information searching | ● | Information collection ● | | Information analysis | ◆ | Tolerant multi-culture |
| ➤ Beauty of sword-lion | Route designing/Teamwork | ● | Knowledge integration ● | | Knowledge application | ◆ | Communicative skill |
| ➤ Field trip -Natural beauty | Knowledge sharing | ● | Botany knowledge | ● | Observation | ◆ | Social interaction |
| ➤ Sea silk route | Use mobile devices | ● | Culture and economy | ● | Business evolution | ◆ | Embrace challenge |
| ➤ Sword-lion on epals | Anping local culture | ● | Computer skills | ● | Language (English) | ◆ | Communicative skill |
| ➤ OP boat | tie knots/ assemble and OP boat | ● | Sailing skill | ● | Innovative thoughts | ◆ | Social interaction |
| ➤ Taijiang National Park | Knowledge in reclamation & environmental change | ● | Team work | ● | Presentation skill | ◆ | Cooperation |
| | | | | | | ◆ | Collaboration |

**Reference**
Al-Gahtani, S., & King, M. (1999). Attitudes, satisfaction and usage: Factors contributing to each in the acceptance of information technology. *Behavior and Information Technology, 18*, 277-297.
Bandura, A. (1977). *Social learning theory*: Prentice-Hall.
Benavides-Velasco, C. A., & Quintana-Garcia, C. (2008). Innovative Competence, Exploration and Exploitation: The Influence of Technological Diversification. *Research policy, 37*(3), 492-507.
Burguillo, J. C. (2010). Using game theory and competition-based learning to stimulate student motivation and performance. *Computers & Education, 55*(2), 566-575.
Chen, B. H., Hsu, M. S., & Chen, M. H. (2012). The relationship between learning attitude and anxiety in accounting class: the case of hospitality management university students in Taiwan. *Quality & Quantity, 47*(5), 2815-2827.
Chen, C. P., Shih, J. L., & Ma, Y. C. (2014). Using instructional pervasive game for school children's cultural learning. *Educational technology & Society, 17*(2), 169-182.
Csikszentmihalyi, M. (1975). Play and intrinsic rewards. *Humanistic Psychol, 15*, 41-63.
Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, & User  Acceptance of Information Technology. *MIS Quarterly, 13*(3), 319-340.
Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1992). Extrinsic and Intrinsic Motivation to Use Computers in the Workplace. *Journal of Applied Social Psychology, 22*(14), 1111-1132.
Dickey, M. D. (2005). Engaging by design: How engagement strategies in popular computer and video games can inform instructional design. *Education Training Research and Development, 53*(2), 67-83.

Enkel, E., Gassmann, O., & Chesbrough, H. (2009). Open R&D and open innovation: exploring the phenomenon. *R&D Management, 39*(4), 311-316.

Fornell, C. A. D. F. L. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*(8), 39-50.

Fu, F. L., Wu, Y. L., & Ho, H. C. (2009). An investigation of coopetitive pedagogic design for knowledge creation in web-based learning. *Computers & Education, 53*(3), 550-562.

Gee, J. P. (2003). *What video games have to teach us about learning and literacy*. New York, NY: Palgrave.

Grant, R. M. (1991). The Resource-based Theory of Competitive Advantage: Implications for Strategy Formulation. *California Management Review of Accounting Studies*, 114-135.

Hair, J. F., Anderson, R. E., Tatham, R. I., & Black, W. C. (1998). *Multivariate data analysis with readings*. NY: Paulist press.

Huang, C. C., Yeh, T. K., Li, T. Y., & Chang, C. Y. (2010). The idea storming cube: Evaluating the effects of using game and computer agent to support divergent thinking. *Educational Technology & Society, 13*(4), 180-191.

Hwang, G. J., Tsai, C. C., & Yang, S. J. H. (2008). Criteria, strategies and research issue of context-aware ubiquitous learning. *Educational Technology & Socialty, 11*(2), 81-91.

Hwang, G. J., Wu, P. H., & Chen, C. C. (2012). An online game approach for improving students' learning performance in web-based problem-solving activities. *Computer & Education, 57*(4), 1246-1256.

Klopfer, E., Sheldon, J., Perry, J., & Chen, V. H. (2012). Ubiquitous games for learning (UbiqGames): weatherlings, a worked example. *Journal of Computer Assisted Learning, 28*(5), 465-476.

Lazzaro, N. (2004). *Why we play games: Four keys to more emotion without story*. Oakland, CA: XEODesign Inc.

Lin, C. T., & Chuang, S. S. (2017). Project-based Learning incorporating Interdisciplinary Curriculums Increase Learners' Satisfaction. *International Journal of Education and Social Science, 4*(9), 29-39.

Liu, G. Z., & Hwang, G. J. (2009). A key step to understanding paradigm shifts in e-learning: Towards context-aware ubiquitous learning. *British Journal of Educational Technology, 40*(2), E1-E9.

Lu, J., Yao, J. E., & Yu, C. S. (2005). Personal innovativeness, social influences & adoption of wireless Internet services via mobile technology. *The Journal of Strategic Information Systems, 14*(3), 245-268.

McLoughlin, C., & Lee, M. J. W. (2010). Personalised and self-regulated learning in the Web 2.0 era: International examplars of innovative pedagogy using social software. *Australasian Journal of Educational Techonolgy, 26*(1), 28-43.

Naonaka, I., & Toyama, R. (2007). Strategic management as distributed practical wisdom. *INdustrial and Corporate Change, 16*(3), 371-394.

Neter, J., Kutner, M. H., Nachtsheim, C. J., & W., W. (1996). *Applied Linear Regression Models*. Illinois: Burr Ridge.

Nysveen, H., Pedersen, P. E., & Thorbjørnsen, H. (2005). Intentions to Use Mobile services: Antecedents & Cross-Service Comparisons. *Journal of the Academy of Marketing Science, 33*(3), 330-346.

Pfeffer, J. (1982). *Organization and organizations theory*. Boston: Pitman.

Renny, Guritno, S., & Siringoringo, H. (2013). Perceived Usefulness, Ease of Use, and Attitude Toward Online Shopping Usefulness Towards Online Airlines Ticket Purchase. *Procedia- Social and Behavioral Science, 81*, 212-216.

Tseng, H. Y. (2001). *MUD research* (Master Degree). National Chengchi University,

Venkatesh, V., & Davis, F. D. (1996). A Model of the Antecedents of Perceived Ease of Use: Development and Test. *Decision Sciences, 27*(3), 451-481.

Venkatesh, V., & Morris, M. G. (2000). Why Don't Men Ever Stop to Ask for Directgions? Gender, Social Influence, and Their Role in Technology Acceptance and Usage Behavior. *MIS Quarterly, 24*(1), 115-139.

Wan, H. A. (2000). Opportunities to enhance a commercial Web site. *Information and Management, 38*(1), 15-21.

Wu, J. H., & Wang, S. C. (2005). What Drives Mobile Commerce? An Empirical Evaluation of the Revised Technology Acceptance Model. *Information & Management, 42*(5), 719-729.