# 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.

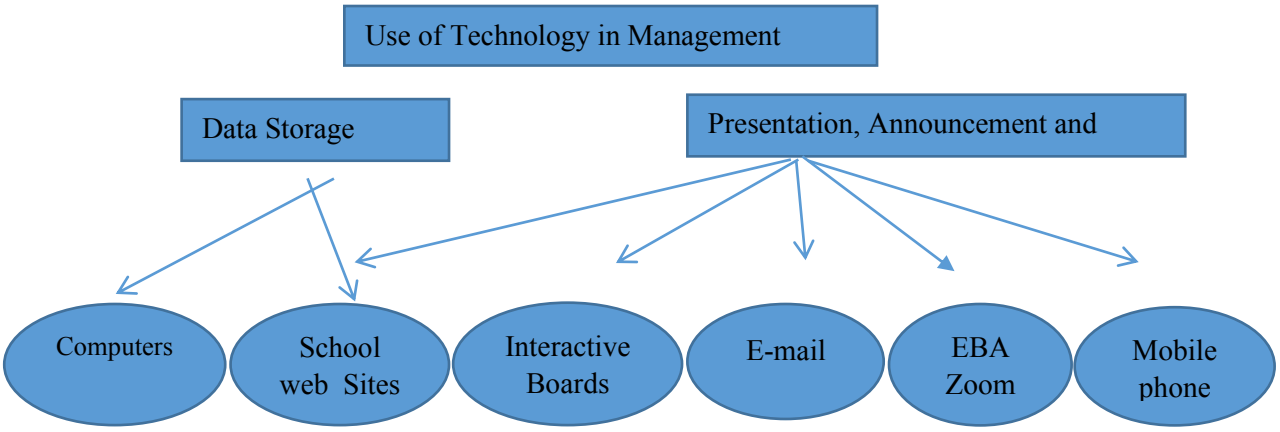


**Figure 1:** Technological tools used in management during the pandemic process

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).

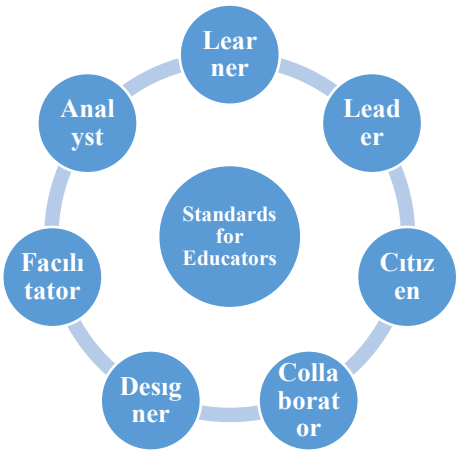


**Figure 2**: ISTE Standards for Educators, Source: ISTE

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).

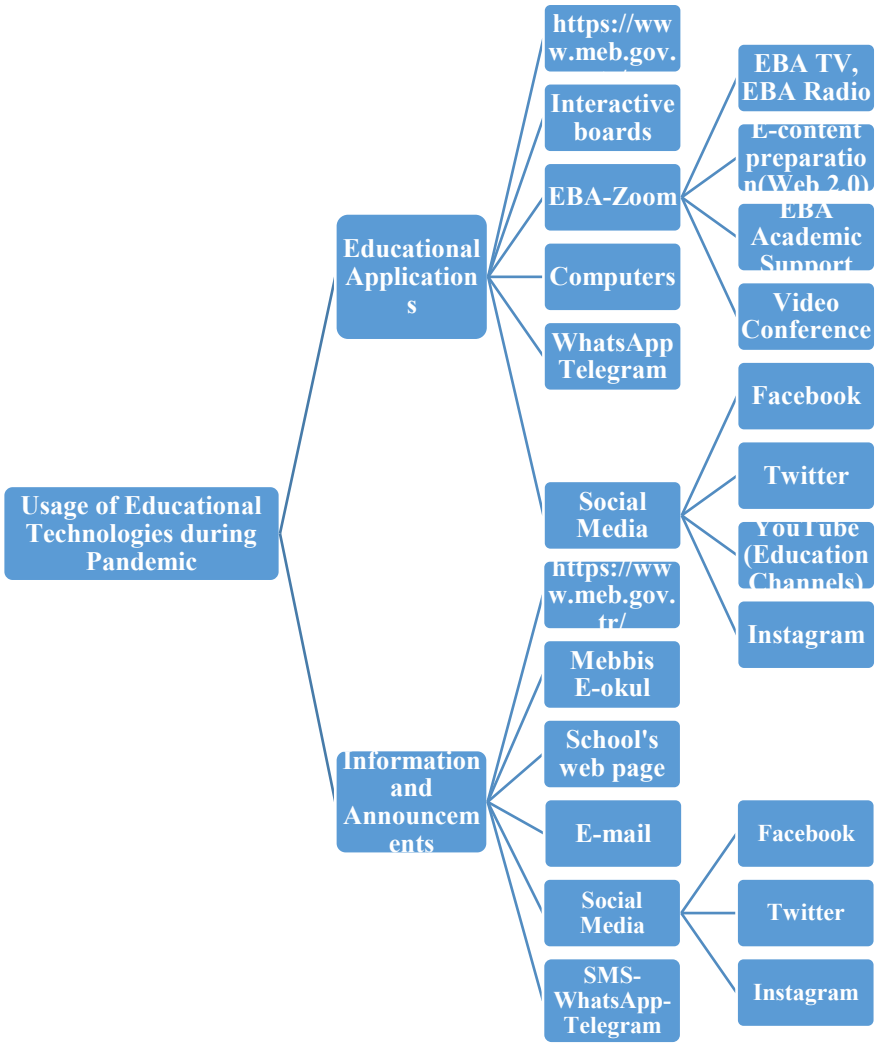


**Figure 3**: Technological tools used in education applications during the pandemic process

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