Perceptions of Classroom Teachers on the Concept of 'Technology' and the Effect of Schools' Technological Infrastructure on the Educational Process: A Qualitative Study

Erdal ZENGİN [1]

[1] ezengin@firat.edu.tr, orcid.org/0000-0002-4771-0160, Fırat University, Türkiye

To Cite: Zengin, E. (2023). Perceptions of classroom teachers on the concept of 'technology' and the effect of schools' technological infrastructure on the educational process: A qualitative study. *Malaysian Online Journal of Educational Technology, 11*(1), 41-58.
http://dx.doi.org/10.52380/mojet.2023.11.1.455

ABSTRACT

The aim of this research is to determine the perceptions of classroom teachers about the concept of technology and the effect of the technological infrastructure of the schools on the education process. For this purpose, interviews were held with 88 primary teachers working in primary schools affiliated to Elazığ and Diyarbakir Provincial National Education in the 2021-2022 academic year. For this purpose, the study was based on the phenomenology pattern, which is included in qualitative studies. While forming the study group of the research, cluster sampling method was preferred in line with the purpose of the research. In this study, in which the phenomenology design, which is one of the qualitative research methods, was used, the study group was formed with the cluster sampling method. The data obtained from the study group were collected with a semi-structured interview form developed by the researcher. The obtained data were analyzed by subjecting them to content analysis. The findings were tabulated and brought to a high level of clarity. As a result of the analysis of the data obtained, it was concluded that the definitions of the majority of the primary teachers regarding the concept of technology were partially correct. It has been determined that 82 of the teachers who make a partially correct definition of technology actively use technology in daily life. According to the data obtained from the primary teachers, it was concluded that the technology used to support education in the education-teaching process is in a close relationship with education. In addition, according to the opinions of the classroom teachers in their opinions, technology contributes positively to the education process. To the question of how adequate the technology, which has a high impact on the education process, is in the infrastructure of the schools, nearly half of the primary teachers stated that the technological infrastructure of their schools is sufficient, while another majority stated that the technological infrastructure is at a medium level. According to the data obtained from the opinion's primary teachers, it has been concluded that the technological infrastructure of the schools is close to the desired level.

Keywords: *Technology, classroom teachers, technological infrastructure in schools*

Article History:
Received: 4 July 2022
Received in revised form: 26 Dec. 2022
Accepted: 8 January 2023
Article type: Research Article

INTRODUCTION

Although it is thought that the term technology has emerged recently, this phenomenon has always existed in the history of humanity and has played an effective role in the struggle of man to dominate nature. First of all, man has shaped matter in order to meet his basic needs such as nutrition, shelter and defense and used it as a hunting tool, defense tool and shelter. In a way, man has survived thanks to his ability and skill to shape matter and use it effectively. Developments in science and technology in general, educational

sciences and educational technology in particular force teachers to change their duties and responsibilities, both qualitatively and quantitatively, as the persons responsible for the planning, execution and evaluation of learning-teaching processes. This situation reveals the importance of teacher training more.

Education and technology are two basic elements that have an important role in making human life more active (Alkan, 1995). In today's modern society, where technological opportunities have increased significantly, it is unthinkable that teachers, who are the leaders of education, are indifferent to this field. It is thought that using technological tools appropriately and in a suitable environment (Lea, 1999) can be beneficial and powerful for both teaching and learning processes (Bergen, 2003). Therefore, no society can escape the necessity of integrating technology into education in the new information age. In the light of this necessity, computer technology has been perceived as an important issue and the debate about whether teachers are sufficiently educated or not has become the subject of many studies (Kortecamp & Croninger, 1996; Jarvis & Rennie, 1998; Ritchie & Rodriguez, 1996). ; Davis, 2000; Gürbüz, Yıldırım, & Özden, 2001; Whetstone & CarrChellman, 2001; McDonald, 2002; Ellis, 2003).

When using computers in education, educators first need to know computers themselves and learn to use them, and then introduce and teach them to children. In the next stage, it is necessary to integrate the computer into the natural learning environment, and to apply computer software that is suitable for the development, age and interests of the child and that supports the children's opportunities to explore freely (Arı & Bayhan, 1999; Bayhan & Güler, 2002). In addition to the use of computers in education, educational software should be selected in accordance with the developmental levels, interests and needs of children in order to provide computer-assisted education correctly and effectively. When choosing computer software, the teacher should also pay attention to whether the software is easy to use for children, whether it teaches information gradually, whether the exercises are diversified, whether they are interactive, whether the feedback is appropriate and appropriate (Sığırtmaç, Yılmaz, & Solak, 2006).

Helping students acquire a comprehensive and accurate understanding of technology is one of the important goals of technology education. Research has emphasized the importance of individuals' understanding of technology from various perspectives (Ankiewicz, 2018; DiGironimo, 2011; Olson, 2013; Rohaan et al., 2010). A person's concept of technology can influence what knowledge and skills they employ in a technological task and therefore affect their technological competence. Students' broader concepts of technology are more likely to perform their technological activities holistically, that is, to show the connections between various stages in the process (such as analyzing technological situations, making technological decisions or evaluating technological activities) (Su & Ding, 2022). A person's narrow technology concepts will constrain their technological practice and potential to learn technology-related concepts and processes (Jones, 1997). Students who have a comprehensive and accurate concept of technology are more likely to become educated individuals who can understand the world around them and the consequences of modern technologies and make informed and informed decisions about technology, rather than being ignorant consumers of technology (Olson, 2013).

Another issue that is closely related to their attitudes towards technology is the approach of teachers and students to the concept of technology. Although the students' Attitude towards Technology studies and in addition, teachers' perceptions of the concept of technology have revealed that they have a positive attitude towards technology in general, but they have a limited perception in defining the concept of technology (Ankiewicz, 2018), researchers believe that the person's comprehensive and rational concept of technology They agreed that it would help improve technology (Ankiewicz, 2018; Rohaan et al., 2010). In addition, due to the close relationship between modern technology and science, having a comprehensive and accurate understanding of technology can help students better understand the relationship between technology and science, build an appropriate understanding of science, and see the difference between them (DiGironimo, 2011). Students, who are expected to establish a relationship between science and technology, should be exposed to these two concepts sufficiently. It is also important in this respect whether students reach the technological tools they need to reach in the classroom environment at the necessary times and during the learning processes. In the classroom environment where educational tools are used as a material and in classroom environments where these tools are not available or are not sufficient, the reflections of

this on the educational status of the students also point to a separate problem.

It is important to use more educational tools in the classroom environment so that students can better understand what they have learned. In today's classroom environment, visual and auditory tools come to the fore. In this sense, it is an inevitable need to apply to learning environments that will be created with visual and auditory tools that reach more sense organs for the realization of permanent learning (Dursun, 2006). Educational tools and materials, textbooks are the elements of the educational environment that bring effectiveness to teaching. According to the student, qualified textbooks and educational tools are expected to facilitate the student's perception of the stimulus (such as the multifaceted, remarkable and pleasing sense of the stimulus), to increase the learning motivation, and to contribute to the student's thinking and production power by establishing meaningful patterns with his past experiences (Bilgen, 2008). In this case, educators can enrich their classrooms with tools and materials during teaching activities prepared based on active learning with a student-centered education approach. Ornstein and Lasley (2000) stated that educational materials should be well designed and used in a planned manner. The materials to be used in education should be suitable for the characteristics of the students. In addition, it should be easily obtainable and usable (Senemoğlu, 2001).

There are many studies in the literature on the use of technological tools as educational tools (Ankiewicz, 2018; DiGironimo, 2011; Kortecamp & Croninger, 1996; Jarvis & Rennie, 1998; Murphy & Greenwood, 1998; Rohaan et al., 2010Ritchie & Rodriguez, 1996;). Most of these studies have revealed that technological tools should be used effectively in the education process. This raises the question of whether educational institutions have sufficient technological infrastructure. In addition, to what extent technological tools support the education of students also points to the question that requires a separate answer. Therefore, the aim of this study is to reveal the opinions of classroom teachers about the concept of technology and the technological infrastructure of schools. It is thought that the findings to be obtained as a result of the study will make important contributions to the literature. The answers to the following questions were sought for the purpose of the study;

- Can you give a definition for the concept of technology?
- Could you tell us about your use of technological tools?
- What do you think is the relationship between technology and education? Can you explain?
- What is your opinion about the effect of technological tools on the education process? Can you explain?
- When you consider the technological infrastructure of your school, do you think there is a sufficient infrastructure to support the education process of the students? Why?
- Do you think that your students have a sufficient level of relationship with the existing technological tools of the school? Why?
- Considering the relationship between students and technological tools, should this be interpreted as an advantage or a disadvantage? Why?
- What is the relationship between education and technology when you create a hierarchical structure? Why?

RESEARCH METHOD

Research Model

This research was carried out based on the phenomenology pattern, which is included in qualitative studies. Phenomenological research is a strategy in which the researcher is questioned through the description of the participants in order to reveal what people experience about the subject (Creswell, 2016; Merriam, 2018). Phenomena can appear in various forms such as events, experiences, perceptions, orientations, concepts and situations in the world we live in. Phenomenology is an appropriate research method for studies that aim to investigate phenomena that are not completely foreign to us and that we cannot fully comprehend (Şimşek & Yıldırım, 2016). Moustakas (1994); He characterizes phenomenology, which seeks to understand lived experiences, as a philosophy and a method that involves examining a small

number of subjects through a comprehensive and sustained focus to develop relationships of procedure, pattern, and meaning.

The reason for choosing phenomenology in this study; To reveal the perception of primary school teachers about the concept of technology and the technological infrastructure of schools. This strategy has been adopted in order to reveal the ideas of classroom teachers about the meaning they attribute to the concept of technology, the equipment status of the technological infrastructure of the schools and the contribution of this equipment to the education of students.

Participants

Qualitative research, which aims to research and reveal the data that has connections to a bible, aims to reach the thoughts that the person has about the event or facts in his mind, as well as working with small sample groups (Miles & Huberman, 2016). In this study, in which qualitative research was preferred, "purposive sampling" was used to obtain the data to be collected qualitatively. Therefore, in order to achieve this aim, the "cluster sampling method" was used. In purposive sampling, the main purpose is to consciously choose the people and institutions suitable for the problem situation being investigated and to choose the most appropriate sample that will serve the purpose (Creswell, 2017). Since certain criteria are taken into account during the creation of the sample group in the research, the criterion sampling strategy will be used as a sampling strategy (Patton, 2014).

Table 1. ***Demographic Data of the Study Group***

Feature		f
Gender	Female	35
	Male	53
Age	30 and below	20
	Between 31-40	46
	Between 41-50	12
	50 and above	10
Seniority	10 and below	45
	Between 11-20	25
	20 and above	18
Education level	Licence	80
	Master's Degree	8
	Doctorate	-
Where he/she works	City	45
	Town	43

When the data in the table is examined, there are 35 women and 53 men in the study group of the research. 20 of them are 30 and below, 46 are between 31-40, 12 are between 41-50 and 10 are 50 and over. In addition, it is seen that 45 of the participants have a seniority of 10 and below, 25 of them have a seniority of 11-20, and 18 of them have a seniority of 20 and above. In addition, 80 of the participants stated that they had a bachelor's degree and 8 had a master's degree. It was determined that none of the participants could have a doctorate degree.

Two criteria were determined for the participants who will be in the sample group in order to achieve the objectives of the study. The first of these criteria is that the participating teachers must be classroom teachers. As a second criterion, all of the participants should be working in primary school level schools. The study group of the research consists of teachers working in primary schools affiliated to MEB in Elazig and Diyarbakir in the spring term of the 2021-2022 academic year. Interviews were held with 52 classroom teachers working in primary schools affiliated to Elazığ Provincial Directorate of National Education and District National Education Directorates, and 38 classroom teachers working in primary schools affiliated to Diyarbakır Provincial Directorate of National Education and District National Education Directorates.

Data Collection Tool

A semi-structured interview form was used to obtain the data aimed at the study from the study group of the research. This type, which is the most used among interview techniques, provides in-depth information by asking additional questions during and at the end of the interview (January, 2019). The semi-structured interview form was designed with a pool of questions prepared by the researcher. The reason for following this path is to ensure that the prepared interview questions are examined in terms of clarity, clarity and relevance to the field. The interview form was examined in terms of clarity, clarity and suitability for the field. In line with the feedback of field experts and classroom teachers, the interview form was finalized and made ready for application. The questions of the interview form were prepared by the researcher. The draft interview form prepared was sent to two experts in the field, two primary school branch teachers and two classroom teachers, and its control was ensured. According to the feedback received, the interview form was revised and finalized. The semi-structured interview form consists of eight open-ended questions. These questions are:

- Can you give a definition for the concept of technology?
- Could you tell us about your use of technological tools?
- What do you think is the relationship between technology and education? Can you explain?
- What is your opinion about the effect of technological tools on the education process? Can you explain?
- When you consider the technological infrastructure of your school, do you think there is a sufficient infrastructure to support the education process of the students? Why?
- Do you think that your students have a sufficient level of relationship with the existing technological tools of the school? Why?
- Considering the relationship between students and technological tools, should this be interpreted as an advantage or a disadvantage? Why?
- What is the relationship between education and technology when you create a hierarchical structure? Why?

Collection of Data

Before the semi-structured interview form developed by the researcher was applied to the participants, it was ensured that the participants filled and signed the voluntary consent form stating that they voluntarily participated in the research. The researcher had a one-on-one interview with each participant. While the interviews were conducted face-to-face in the central primary schools of the province of Elazığ, the interviews were conducted remotely in the primary schools of the district center. Remote interviews were conducted with all the participants who participated in the province of Diyarbakir. The obtained data has been protected for analysis.

Data Analysis

In order to examine the data obtained in the research, it was analyzed by content analysis in accordance with the purpose of the research. Content analysis can be defined as the process of categorizing the data obtained from the participants during the research process in accordance with the research topic (Özdemir, 2010). The findings obtained through content analysis were interpreted descriptively and supported by the data obtained from the study group. In addition, direct quotations will be made from the statements of the participants for each category. In descriptive analysis, data are summarized and interpreted according to predetermined themes (Özdemir, 2010).

Validity and Credibility

In scientific research, validity and reliability criteria are widely used in terms of the credibility of the results. Validity; While expressing the accuracy of the findings, reliability is concerned with whether the

findings are consistent (Altheide & Johnson, 1994). For this purpose, the data collected in the study were coded into the analysis form by two researchers in separate times and places. The reliability of the study was calculated by using the separately coded data "Number of consensus / total agreement + number of disagreements" formula determined by Miles and Huberman (2016). Miles and Huberman (1994) stated that a reliability coefficient (>70%) would be sufficient for reliability in qualitative studies. In this context, the calculated reliability rate was calculated as 95%. In order to ensure the validity of the research, expert opinion was regularly consulted from the beginning to the end of the research process, and direct quotations were made from the texts and measurement and evaluation sections in the findings section. In addition, the data collection process ensured the consistency of the findings with the literature. All these procedures were found appropriate and sufficient by different researchers to ensure validity (Yıldırım & Şimşek, 2008; Silverman, 2018).

FINDINGS

As a result of the research, the data obtained from the study group were analyzed by subjecting them to content analysis, and the findings were briefly interpreted under the tables in a descriptive way. Tables were used for the simplified representation of these findings. Tables are shown under a total of 8 headings. Each table consists of the answers obtained from the questions in the semi-structured interview form.

Findings related to the definitions made by classroom teachers for the concept of "Technology"

The findings obtained regarding the definitions made by classroom teachers for the concept of "Technology" are given in Table 2 below. In order to provide a clear and understandable view of the research data in the table with the findings obtained, the category, codes and frequency (f) are tabulated.

Table 2. ***Findings Related to the Definitions Made by Primary School Teachers for the Concept of "Technology"***

Category	Code	f
Correct definition of the concept of “technology”	S1, S5, S13, S17, S23, S45, S57, S86	8
Partially correct definition of the concept of “technology”	S2, S3, S4, S6, S7, S8, S9, S10, S12, S14, S18, S19, S20, S21, S22, S24, S26, S27, S28, S29, S30, S31, S32, S33, S34, S35, S36, S37, S38, S39, S40, S41, S42, S44, S46, S48, S49, S50, S51, S52, S53, S54, S55, S56, S58, S59, S60, S61, S62, S63, S64, S65, S66, S67, S68, S69, S70, S71, S72, S73, S74, S75, S76, S77, S78, S79, S80, S81, S82, S83, S84, S85, S87, S88	73
Misdefinition of the concept of "technology"	S11, S15, S16, S25, S47	5

“Can you make a definition for the concept of technology?” in the interview form. It has been determined that the majority of the class teachers have made a partially correct definition in the definition of the concept of 'technology'. It is seen in the table that there are 8 teachers who make definitions in the category of "correct definition of the concept of technology", 73 people who make definitions in the category of partially correct definition of the concept of "technology", and 5 teachers who make definitions in the category of incorrect definition of the concept of "technology". Examples of the definitions made are shown below:

S-79 “All of the tools used to produce a new product are called”.
S-4 “Everything that changes, develops and transforms according to the needs of people”.
S-5 “Machinery, tools and equipment are all tools that are frequently used in the fields of industry, education and health and make life easier”.
S-11 “It is used in education, communication and many parts of life”.

Findings obtained from the opinions of classroom teachers on the use of technological tools

The findings obtained from the opinions of the classroom teachers regarding the use of technological tools are given in Table 3 below. In order to provide a clear and understandable view of the research data in the table with the findings obtained, the category, codes and frequency (f) are tabulated.

Table 3. ***Findings From the Opinions of Primary School Teachers on the Use of Technological Tools***

Category	Code	Participants expressing the relevant code	*f*
Positive reviews	I use it according to my need	S19, S20, S21, S22, S24, S26, S27, S28, S29, S30, S31, S32, S33, S34, S35, T36	16
	I use a technological tool for educational purposes	S37, S38, S39, S40, S41, S42, S44, S46, S48, S49, S50, S51, S52, S53, S54	15
	I use technological tools very often	S4, S6, S7, S8, S9, S10, S12, S14, S18, S55, S72, S73	12
	I have a high interest in technology	S1, S5, S13, S17, S23, S56, S58, S59, S60, S61,	10
	I use technology consciously	S45, S57, S86, S62, S63, S64, S65	7
	I use it after doing the necessary research about the technological tool	S68, S69, S70, S71, S87, S88	6
	I use technology as much as I can	S2, S3, S74, S75, S76, S77	6
	It is indispensable in daily life	S78, S79, S80, S81	4
	I use it actively in all areas of life.	S82, S83, S84, S85	4
	I use it for foreign language education.	S66, S67	2
Negative reviews	I use it because I have to, otherwise I think it's harmful	S11, S15, S16	3
	I'm not good with technology	S25, S47	2
	I won't use it if I'm not force majeure	S7	1

"Can you give information about your use of technological tools?" in the interview form the data obtained from the classroom teachers for the question are shown in Table 3. According to the findings obtained from the opinions of the teachers, it was determined that the majority of them expressed positive (82) opinions, while a few of them reported negative opinions (6). The codes most emphasized by the classroom teachers who expressed their opinions around the theme of "interest in technological tools" are: "I use it according to my needs (16), I use technological tools for educational purposes (15), I have a high interest in technology (10) and I use technology consciously (7) " has been found. Examples of the codes with the most emphasis are given below:

S-27 "I frequently use technological tools as a requirement of the age we live in. I follow technological developments. I take care to use it within my interest and need".

S-69 "I take care to actively use technological tools at my workplace, at home and in many places. In cases where I am deficient and have little knowledge, I make up for this deficiency with the help of technological tools. In fact, I do a thorough research before using technological tools. If necessary, I will buy it to use it later".

S-38 "I take care to use technological tools as much as possible. When using these tools, such as phones, tablets and computers, which are gifts of our age, I use them according to my profession, teaching. I take care to use it actively in the education-teaching process".

Findings from primary school teachers' views on the relationship between technology and education

The findings obtained from the opinions of classroom teachers regarding the relationship between technology and education are given in Table 4 below. In order to provide a clear and understandable view of the research data in the table with the findings obtained, the category, codes and frequency (f) are tabulated.

Table 4. ***Findings from Primary School Teachers' Views on the Relationship Between Technology and Education***

Category	Code	Participants expressing the relevant code	*f*
There is a relationship between them	Technology has a positive impact on education	S4, S6, S7, S8, S9, S10, S12, S14, S29, S30, S31, S32, S33, S34	14
	Technology and education are intertwined	S1, S5, S13, S35, S36, S46, S48, S49, S50, S51, S52, S53, S54	13
	Technology supports education	S19, S20, S21, S22, S24, S26, S27, S28, S29, S30, S31, S32, S33, S34,	12
	Technology is an integral part of education	S37, S38, S39, S40, S41, S42, S44, S18, S55, S72	10
	Technology improves education	S17, S23, S56, S58, S59, S60, S61, S45, S57	9
	Education improves technology	S86, S62, S63, S64, S65, S68, S69, S70, S71	9
	Technology provides the embodiment of knowledge in education	S87, S88, S2, S3, S74, S75, S76, S77	8
	Both support each other	S78, S79, S80, S81, S82, S83, S84,	7
	Increases the effectiveness of training		
	Technology makes learning permanent	S85, S66, S67	3
There is no relation between them	There is no relationship between education and technology	S11, S15,	2
	Technology and education are different fields	S7	1

In the interview form, "What kind of relationship do you think there is between technology and education? Can you explain?" The data obtained from the classroom teachers for the question are shown in Table 4. According to the findings obtained from the opinions of the teachers, almost all of the teachers stated that there is a relationship between technology and education (85), and very few of them stated that there is no relationship between technology and education (3). The most emphasized codes of the classroom teachers who expressed their opinions around the theme of "the relationship between technology and education" are: "Technology has a positive effect on education (14), Technology and education are intertwined (13), Technology supports education (12), Technology is an integral part of education. (10), Technology improves education (9) and Education improves technology (9)". Examples of the codes with the most emphasis are given below:

S-19 "Technology has a positive impact on education. Projectors, computers and many other technological tools support the development of education and the educational process of students. Therefore, it is obvious that this positive relationship reflects positively on education".

S-5 "Today, technology is fully involved in education. Today, education is given with virtual glasses instead of laboratories in some countries. Technology, which makes it possible to conduct experimental research in all environments and conditions, is intertwined with education. In this case, when we look at our country, unfortunately, we are very lacking in technology. It is almost as if there are no technological tools in most of our schools".

S-32 "As a supporter of technology education, it takes responsibility in the education process. Today, where education is supported by technology, it is important for this relationship to develop further".

Findings obtained from teachers about the effect of technological tools on the education-teaching process

The findings obtained from the teachers regarding the effect of technological tools on the education-teaching process are given in Table 5 below. In order to provide a clear and understandable view of the research data in the table with the findings obtained, the category, codes and frequency (f) are tabulated.

Table 5. ***Findings Obtained from Teachers Regarding the Effect of Technological Tools on the Education-Teaching Process***

Category	Code	Participants expressing the relevant code	*f*
Technology has a positive effect on education	Increases students' attention to the lesson	S4, S6, S7, S8, S9, S10, S12, S14, S29, S30, S31, S32, S33, S34, S11, S15, S85, S66, S67, S72, S84,	21
	Provides efficient use of time	S1, S5, S13, S27, S28, S35, S36, S46, S48, S49, S50, S51, S52, S53, S54	15
	Saves time and space	S19, S20, S21, S22, S24, S26, S29, S30, S31, S32, S33, S34, S44, S18	14
	Increases the effectiveness of training	S17, S23, S56, S58, S59, S37, S38, S39, S40, S41, S42, S55,	12
	It embodies education	S60, S61, S45, S57, S86, S62, S63, S64, S65, S68	10
	Facilitates access to information needed in the classroom environment	S69, S70, S71, S87, S88, S2, S3, S74	8
	Increases efficiency in education	S75, S76, S77, S80, S82, S83,	6
	Increases classroom interaction	S81, S78	2

What is your opinion on the effect of technological tools on the education-teaching process in the interview form? Can you explain?" The data obtained from the classroom teachers for the question are shown in Table 5. According to the findings obtained from the opinions of the teachers, all of the teachers (88) stated that technology had a positive effect on education. The codes most emphasized by the classroom teachers who expressed their opinions on the theme of "the reflection of technology in education" are: "It increases the attention of the students towards the lesson (21), It ensures the efficient use of time (15), It saves time and space (14), It increases the effectiveness of education (12) It concretizes education (10) and facilitates access to information needed in the classroom (8)". Examples of the codes with the most emphasis are given below:

S-6 "It is very important that it accelerates the process, appeals to more people at the same time, and creates a rich choice area visually and audibly. This increases students' attention towards the lesson".

S-36 "Technology has serious advantages in terms of education as it provides easier and quicker access to information. I think that technological tools will enable efficient use of time in terms of education. Time is already the most needed point in the education process".

S-12 "With technology, we reach information very quickly. After all, isn't access to information an aim or the most important purpose of education? We get information from many different places in many different ways. Technology, which enables the acquisition of information in a much more interesting and entertaining way in the education process, is actually an indispensable resource for education".

Findings obtained from teachers' opinions on the state of the technological infrastructure of schools supporting the education process of students

The findings obtained from the opinions of the teachers regarding the state of the technological infrastructure of the schools supporting the education process of the students are given in Table 6 below. In order to provide a clear and understandable view of the research data in the table with the findings obtained, the category, codes and frequency (f) are tabulated.

Table 6. ***Findings from Teachers' Opinions on the State of the Technological İnfrastructure of Schools Supporting the Education Process of Students***

Category	Code	Participants expressing the relevant code	*f*
Technological infrastructure is at a sufficient level	Our school has a good level of technological infrastructure.	S4, S6, S7, S8, S9, S10, S12, S14, S29, S30, S31, S32, S33, S34, S11, S15, S85, S66, S67, S72, S84, S81, S78, S75, S76, S77, S80, S82, S83, S60, S61, S45, S57, S86, S62, S63, S64, S65, S68, S69, S70, S71, S87, S88, S2, S3, S74, S55	48
Technological infrastructure at medium level	Our school has a medium level of technological infrastructure.	S1, S5, S13, S27, S28, S35, S36, S46, S48, S49, S50, S51, S52, S53, S54, S19, S20, S21, S22, S24, S26, S29, S30, S31, S32, S33, S34, S44, S18	29
Insufficient technological infrastructure	There is not enough technological infrastructure in our school	S17, S23, S56, S58, S59, S37, S38, S39, S40, S41, S42	11

In the interview form, "When you think about the technological infrastructure of your school, do you think there is a sufficient infrastructure to support the education process of the students? Why?" The data obtained from the classroom teachers for the question are shown in Table 6. According to the findings obtained from the teachers' opinions, 48 of the teachers stated that their schools had a sufficient level of technological infrastructure, 29 of them stated that their schools had a medium level of technological competence, and 11 of them stated that their schools had an insufficient level of technological infrastructure. Codes obtained from the opinions of classroom teachers who expressed their opinions around the theme of "Technological infrastructure of schools": "There is a good level of technological infrastructure in our school (48), There is a medium level of technological infrastructure in our school (29) and there is not enough technological infrastructure in our school (11)" has been in the form. Sample expressions for these codes are given below:

S-77 "The school administration did its best to strengthen the school's technological infrastructure. As a result, we have a school with a strong technological infrastructure".

S-55 "There are many technological tools in our school. This technological infrastructure not only facilitates the educational life of students, but also allows them to access information and science very easily".

S-49 "Our school has a medium-level technological infrastructure. Although it has some technological tools, it actually lacks some technological tools that should be. For example, we do not have a smart board. If that was the case, we would be a very strong school technologically".

Findings from teachers' opinions on the level of students' relationship with the existing technological tools that the school has

The findings obtained from the teachers' opinions regarding the level of relationship between the students and the existing technological tools that the school has are given in Table 7 below. In order to provide a clear and understandable view of the research data in the table with the findings obtained, the category, codes and frequency (f) are tabulated.

Table 7. Findings From Teachers' Opinions on the Level of Students' Relationship with the Existing Technological Tools that the School Has

Category	Code	Participants expressing the relevant code	f
There is a high level of interaction	There is a high level of interaction between students and technological tools	S4, S6, S7, S8, S9, S10, S12, S14, S29, S30, S31, S32, S33, S34, S11, S15, S85, S66, S67, S72, S84, S81, S78, S75, S76, S77, S80, S82, S83, S60, S61, S45, S57, S86, S62, S63, S64, S65, S68, S69, S70, S71, S87, S88, S2, S3, S74, S55, S32, S33, S34, S44,	52
There is moderate interaction	Students' interaction with technological tools is weak	S1, S5, S13, S27, S28, S35, S36, S46, S48, S49, S50, S51, S52,	13
There is insufficient interaction	There is not enough and the right level of interaction	S17, S23, S56, S58, S59, S37, S38, S39, S40, S41, S42, S53, S54, S19, S20, S21, S22, S24, S26, S29, S30, S31, S18	23

In the interview form, “Do you think that your students have a sufficient relationship with the current technological tools that the school has? Why?" The data obtained from the classroom teachers for the question are shown in Table 7. According to the findings obtained from the opinions of the teachers, 52 of the teachers stated that the interaction of the students with the technological tools of the school was at a sufficient level, 23 of them stated that there was not enough interaction, and 13 of them had a medium level of interaction. Codes obtained from the opinions of classroom teachers who expressed their opinions around the theme of "student-technology interaction": "There is a high level of interaction between technological tools and students (52), Students' interaction with technological tools is weak (13), and There is a sufficient and correct level of interaction. not (23)”. Sample expressions for these codes are given below:

S-62 “Since the pandemic process, students have started to use technological tools more actively. After this process, the technological opportunities of the school began to attract the attention of the students much more. In addition, students started to use smart boards and projectors in the classroom more easily. Of course, if this interaction, which is under our control, continues at this level, the educational processes of the students will remain at a supportive level”.

S-19 “Because the technological opportunities of the school are few and limited, students cannot interact with technological tools at a sufficient level. In fact, the low level of interaction should not appear as a negative reflection, but as a positive reflection. Because as students' interaction with technological tools increases, their interest in the lesson and school decreases. Since a correct relationship is not established with technological tools, technological tools that should support the education of students take on a structure that gives students negative behaviors”.

S-27 “I do not think that students' relationship with technological tools is at a sufficient level. In fact, the technological infrastructure of the school has a lot of influence on this. Since the students are not acquainted with sufficient technological tools, the interaction remains at a limited level”.

Findings from teachers' views on interpreting students' relationship with technological tools as an advantage or disadvantage

The findings obtained from the opinions of the teachers regarding the interpretation of the students' relationship with technological tools as an advantage or disadvantage are given in Table 8 below. In order to provide a clear and understandable view of the research data in the table with the findings obtained, the category, codes and frequency (f) are tabulated.

Table 8. ***Findings From Teachers' Views on Interpreting Students' Relationship with Technological Tools as an Advantage or Disadvantage***

Category	Code	Participants expressing the relevant code	f
Advantage	It is an advantage if used correctly.	S15, S85, S66, S67, S72, S84, S81, S78, S75, S76, S77, S80, S82, S83, S60, S61, S45, S57, S86, S62, S63, S49, S50, S51, S52,	25
	It is an advantage if used appropriately.	S9, S64, S65, S68, S69, S70, S71, S87, S88, S2, S3, S74, S55, S32,	14
	It would be an advantage if used for educational purposes.	S40, S41, S42, S53, S54, S19, S20, S21, S22, S24, S26, S29, S30	13
	It will be an advantage if used in a controlled manner.	S14, S29, S30, S31, S32, S33, S34, S11, S33, S34, S44	11
	Technology itself is an advantage	S4, S6, S7, S8, S10, S12, S36	7
	Technology turns the education process into an advantage	S56, S58	2
Disadvantage	It is a disadvantage for the development of children	S1, S5, S13, S27, S28, S35, S46, S48	8
	It is a disadvantage because it distracts students in the education process.	S23, S59, S37, S38, S39,	5
	It is a disadvantage because it is difficult to control	S17, S31, S18	3

In the interview form, “When the relationship of students with technological tools is considered, should this be interpreted as an advantage or a disadvantage? Why?" The data obtained from the classroom teachers for the question are shown in Table 8. According to the findings obtained from the opinions of the teachers, while 72 of the teachers saw the students' relationship with technological tools as an advantage, 16 of them stated that they saw this relationship as a disadvantage for the students. The most emphasized codes among the opinions of the classroom teachers who expressed their opinions around the theme of "Is technology an advantage or a disadvantage" are: "It is an advantage if used correctly (25), It will be an advantage if it is used appropriately (14), It will be an advantage if it is used for educational purposes (13), If it is used in a controlled manner, it will be an advantage (11) and it is a disadvantage in terms of children's development (8)”. Sample expressions for these codes are given below:

S-80 “I believe that there is always an advantage when technological tools are used correctly. Otherwise, it turns into a disadvantage. When technological tools such as computers are used too much, it causes distraction and various health problems in students”.

S-55 “The technological tools that should be under the control of the parents at home turn into a disadvantage when they get out of control, that is, when the parents cannot control them. However, technological tools used under the control of teachers in the school environment are always seen as an advantage because they are used for educational purposes. Every technological tool used for educational purposes will contribute positively to the developmental periods of individuals. In order for this positive contribution to be continuous, it is important that the technological tools used in schools are suitable for their purpose and under the control of the teacher”.

S-28 “We can say that technological tools that need to be evaluated in many ways are becoming more and more disadvantageous for students. We can say that the technology, which offers an artificial living space, where the research is done with just a finger movement, distracts students from real life. This indicates a situation that appears to be a disadvantage”.

Findings from teachers' views on the hierarchical structure that exists between technology and education

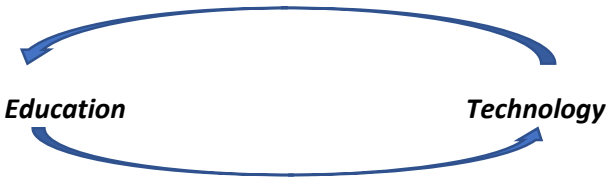
The findings obtained from the opinions of teachers regarding the hierarchical structure that exists between technology and education are given in Table 9 below. In order to provide a clear and understandable view of the research data in the table with the findings obtained, the category, codes and frequency (f) are tabulated.

Table 9. ***Findings From Teachers' Opinions On Interpreting Students' Relationship with Technological Tools as an Advantage or Disadvantage***

Category	Code	Participants expressing the relevant code	f
Education covers technology	Education is always above technology	S15, S82, S83, S60, S61, S45, S57, S86, S62, S63, S49, S50, S51, S52	14
	Technology is a tool that realizes the aims of education.	S9, S64, S65, S68, S69, S24, S26, S29, S30	9
	Education governs, technology governs	S40, S41, S42, S53, S54, S19, S20, S21, S22,	9
	In history, education has existed first and then technology.	S14, S29, S30, S31, S32, S33, S34,	7
Technology education covers	Technology advances education	S1, S5, S13, S27, S28, S35, S46, S48, S56, S58	10
	Technology governs education	S23, S59, S37, S39, S18	5
	The existence of technology makes education continuous	S17, S31, S38	3
Technology and education are on an equal footing	Technology and education feed each other	S85, S66, S67, S72, S84, S81, S78, S75, S76, S77, S80, S70, S71, S87, S88, S2, S3, S74, S55, S32	20
	Technology and education go hand in hand	S4, S6, S7, S8, S10, S12, S36 S11, S33, S34, S44	11

In the interview form, "What kind of relationship is there between education and technology when you create a hierarchical structure? The data obtained from the classroom teachers for the question "Why" are shown in Table 9. According to the findings obtained from the opinions of the teachers, 39 of the teachers stated that education has a position above technology, 18 of them stated that technology has a role that includes education, and 31 of them stated that technology and education have an equal role. The most emphasized codes from the opinions of the classroom teachers who expressed their opinions around the theme of “hierarchy between technology and education” are: “Technology and education feed each other (20), Education is always above technology (14), Technology ensures the advancement of education (10) and Technology does not fulfill the aims of education. It is a tool that performs (9)”. Sample expressions for these codes are given below:

S-66 “Technology and education are in a relationship that feeds each other. This relationship points to a positive situation for both. This relationship needs to expand further. The development of this relationship means improvement in both areas. Therefore, we can say that education equals technology”.



S-52 “Without education, the emergence of technological tools is impossible. Therefore, education always represents a position above technology. Education will progress and develop so that new technological tools and equipment will emerge”.

S-27 “An education without technology is unthinkable. Advancement in technology means progress in education. If technology doesn't advance, education falters. That's why I think technology comes first in hierarchical structure".

DISCUSSION AND CONCLUSION

The aim of the study is to determine the perceptions of classroom teachers about the concept of technology and the effect of the technological infrastructure of schools on the education process. As a result of the analysis of the data obtained for this purpose, it was concluded that the definitions of the majority of the classroom teachers (73) regarding the concept of technology were partially correct. It has been determined that 82 of the teachers who make a partially correct definition of technology actively use technology in daily life. According to the data obtained from the classroom teachers, it was concluded that the technology used to support education in the education-teaching process is in a close relationship with education. In addition, according to the opinions of the classroom teachers in their opinions, technology contributes positively to the education process (88). To the question of how adequate the technology, which has a high impact on the education process, is in the infrastructure of the schools, nearly half of the classroom teachers (48) stated that the technological infrastructure of their schools is sufficient, while another majority (29) stated that the technological infrastructure is at a medium level. According to the data obtained from the opinions of classroom teachers, it has been concluded that the technological infrastructure of the schools is close to the desired level.

The technological infrastructure of the schools should be used as desired and the students should be in contact with these technological tools at a sufficient level (Bricker, Pretti-Frontczak, & McComas, 1998; Oktay, 2007; Yılmaz, Tomris & Kurt, 2016). According to one of the results of the research, it was concluded that the technological infrastructure of the classroom teachers, students and schools is in a high degree of relationship with their students (52) and this has positive contributions to the educational processes of the students. The advantages and disadvantages of this relationship between students and technological tools for students' development and educational processes points to an important point. According to the statements of the classroom teachers on this subject, it was concluded that the relationship between technology and students was positive (72). In order for this relationship to progress positively, it should be under the control of teachers at school and parents at home (Toran et al., 2016). Although the relationship between students and technological tools appears to be positive, it is thought that this positive opportunity will turn into a disadvantage if certain measures are not followed (Mistry, Minkovitz, Strobino & Borzekowski, 2007). The fact that technology has such an important place in education shows how important technology is for education. Is the relationship between technology and education based on a hierarchical structure? From the data obtained from the classroom teachers regarding this question, it was concluded that 39 of the teachers stated that education is in a superstructure of technology, 31 of them stated that education and technology are connected with an equal relational bond, and 18 of them stated that technology is in a higher position for education.

When the literature is examined, it is seen that there are many studies related to technology (Erdoğan & Şerefli, 2021; Mustafaoğlu, Zirek, Yasacı & Özdinçler, 2018; Sırakaya, 2019). When the literature is examined, it has been seen that some of the studies carried out support the results of this research (Kılınç, 2015; Saha, Ayubb &Tarmizi, 2010; Zehir et al., 2019). Studies have found that children play computer, tablet and internet games that are age-appropriate, free of violence and aggression, and mostly support the development of intelligence, under the supervision of their parents and as long as they see fit, and that they support the mental development of children positively (Gündoğdu et al., 2016; Ozkan, 2017). It is thought that the role of parents in the realization of this positive effect is great (Berson & Berson, 2005; Kılınç, 2015). In the studies of Mitchell, Finkelhor & Wolak (2003) it was determined that parents do not leave their children unattended in the face of information and communication technologies, they choose the programs and games that their children will use, and parents tend to control their children's technology use (Dombrowski, LeMasney, Ahia & Dickson, 2004). In addition, other studies are also available in the literature. In one of this study, called "Secondary Education Teachers' Opinions on Using Information Technologies in Their Classes" conducted by Ar (2016), it was found that teachers did not receive sufficient training to use information technologies effectively in their lessons, and that some teachers had a It has been concluded that they received trainings but that these trainings are not at a level to balance the technology usage proficiency that they are obliged to demonstrate within the existing system. On the other hand, Kılıçer (2011) in his doctoral study named "Individual Innovation Profiles of Computer and Instructional Technology Education Teachers"

found that most of the pre-service teachers were high and moderately competent in terms of innovation, most of them were in the "inquiring" category and "open, willing and willing to try innovations". It has been observed that they see themselves as competent to be an opinion leader regarding innovations in the societies in which they live". In addition, Vedi (2013) found in the study "Evaluation of the level of using computer technology of primary and secondary school administrators", that the effective use of information technologies by school administrators was higher than those above the age of 40, and school administrators and teachers with 11-15 years of seniority were 16 years and older. It has been concluded that they can use information technologies more and at a good level compared to those with higher education. Another study that has been done is Önal's (2014) research titled "Secondary School Mathematics Teachers' Opinions on Information Technology Competencies". As a result of this research, it has been determined that teachers generally have self-confidence in using information technologies, they have problems and difficulties in technical issues and they need help in coping with the problems they experience.

The idea that technological devices enter children's daily lives and affect their cognitive, emotional and social development is becoming more common day by day (Tüzün, 2002). Today, there are many opportunities for children to develop their skills such as listening, speaking, reading and writing (Bracken & Fischel, 2008). Children can participate in early literacy activities from their pre-school period. In today's world, technology offers children many opportunities to play, explore and learn (Linebarger & Piotrowski, 2009). These learning opportunities coincide with a critical period in children's development. It is thought that the increase in the use of digital technology, especially that it has become an indispensable part of children's daily lives, and the gradual decrease of outdoor playgrounds cause negative effects on children. For this reason, it is seen that screen addiction and the prolongation of the time allocated to games on technological devices lead to a decrease in the face-to-face communication of children with their peers and group games, while it causes an increase in the games played alone (Rosen et al., 2014). Although the games played on technological devices are fun and intriguing, it has been reported that many games have violent content (Mustafaoğlu, Zirek, Yasacı & Özdinçler, 2018). The place of digital toys in children's play life is gradually increasing (Fields & Kafai, 2009). digital toys; It includes computer-assisted, battery-operated toys and enhanced technologies that make toys talk and act in specific ways. In addition, such toys attract children because of their attractiveness at first and their fancy equipment (Johnson & Christie, 2009). The use of digital games and technological tools in this way opens the door to many negative effects. There are studies (Chassiakos, Radesky, Christakis, Moreno & Cross, 2016; Howie, Coenen, Campbell, Ranelli & Straker, 2017; Pagani, Fitzpatrick, Barnett & Dubow, 2010) revealing that the period they are in has negative effects on the development of children. Some of these negative situations are that they cause musculoskeletal problems in children (Kelly, Dockrell & Galvin, 2009; Harris, Straker, Pollock & Smith, 2015), decrease in sleep habits and increase in physical inactivity disorder (Fakhouri, Hughes, Brody, Kit & Ogden, 201; Strasburger, Jordan & Donnerstein, 2010), an increase in a disease such as obesity (Wethington, Pan & Sherry, 2013). It is possible to prevent this situation from happening, as is the result of the research, to reduce the use of technology in children and students and to turn it into a positive one, with parent and teacher control (Mustafaoğlu, Zirek, Yasacı & Özdinçler, 2018). Parents and teachers should be aware that the technological devices they use can also have a negative impact on their children. If the child does not have time to play actively with the child, parents and teachers should know that playing with another adult or child is an important factor. It will be seen that technology is a useful supporter when it is emphasized sensitively.

Suggestions

After the transition to face-to-face education after the pandemic, no study has been found in the literature on the use of technological tools in students and teachers. In this regard, it is recommended to investigate the use of technological tools in the post-pandemic teachers and students of the necessary researches. It is recommended to conduct a study to determine the students' opinions on whether these technological tools are used adequately in the classrooms in schools with sufficient technological infrastructure. In the study, the majority of classroom teachers see technological tools as a supporter of the educational process. Provided that they are under the control of the teacher, it is recommended to use technological tools more actively than the education-teaching process. Uncontrolled use or insufficient use of technological tools affects the success of students who are in the education process. In order to prevent

this situation and to reach conscious technology user parents and teachers, it is recommended to provide training on the use of technology through in-service seminars.

REFERENCES

Alkan, C. (1995). *Eğitim teknolojisi.* Atilla Kitapevi.

Ankiewicz, P. (2018). Perceptions and attitudes of pupils toward technology. In M. J. de Vries (Ed.), *Handbook of technology education* (pp. 581–595). Springer.

Ar, K. Z. (2016). *Ortaöğretim öğretmenlerinin derslerinde bilişim teknolojilerini kullanma ile ilgili görüşleri.* [Yayımlanmamış yüksek lisans tezi]. Sakarya Üniversitesi.

Arı, M. & Bayhan, P. (1999). *Okul öncesi dönemde bilgisayar destekli eğitim*. EPSİLON Yayınları

Altheide, D. L., & Johnson, J. M. (1994). Criteria for assessing interpretive validity in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 485–499). Sage.

Bergen T. (2003). The role of teachers in a changing world: An international perspective. *Research for Educational Reform*, *8*(1), 49-65.

Berson, I., & Berson, M. (2005). Challenging online behaviors of youth: Findings from a comparative analysis of young people in the US and New Zealand. *Social Science Computer Review, 23*(1), 29-38.

Bilgen, H.N. (1994). *Çağdaş demokratik eğitim*. MEB Yayınları.

Bracken, S. S., & Fischel, J. E. (2008). Family reading behavior and early literacy skills in preschool children from low-income backgrounds. *Early Education and Development, 19*(1), 45–67.

Bricker, D., Pretti-Frontczak, K. ve McComas, N. (1998). An activity-based approach to early intervention. Paulh Brookes Publishing.

Chassiakos, Y. L. R., Radesky, J., Christakis, D., Moreno, M. A., & Cross, C. (2016). Children and adolescents and digital media. *Journal ofthe American Academy of Pediatrics, 138*(5), 3–6.

Davis N. (2000). Information technology for teachers education at its first zenith: The heat is on! *Information Technology for Teacher Education, 9*, 277- 286.

DiGironimo, N. (2011). What is technology? Investigating student conceptions about the nature of technology. *International Journal of Science Education, 33*(10), 1337–1352.

Dombrowski, S. C., LeMasney, J. W., Ahia, C. E., & Dickson, S. A. (2004). Protecting children from online sexual predators: Technological, psycho-educational, and legal considerations. *Professional Psychology: Research and Practice, 35*(1), 65–73. https://doi.org/10.1037/0735-7028.35.1.65

Dursun, F. (2006). Öğretim sürecinde araç kullanımı. *İlköğretmen Dergisi. 1*, 8-9

Ellis, B. R. (2003). An investigation of factors influencing teachers' use of computer-based technology. *Dissertation Abstracts International*, 152. (UMI No. 3110092)

Erdoğan, E., & Şerefli, B. (2021). Sosyal bilgiler öğretiminde teknoloji kullanımı: Beş öğretmenin yolculuğu. *Journal of Qualitative Research in Education*, (27).

Fakhouri, T. H., Hughes, J. P., Brody, D. J., Kit, B. K., & Ogden, C. L. (2013). Physical activity and screen-time viewing among elementary school-aged children in the United States from 2009 to 2010. *Jama Pediatrics, 167*(3), 223–229.

Fields, D. A., & Kafai, Y. B. (2009). A connective ethnography of peer knowledge sharing and diffusion in a tween virtual world. *International Journal of Computer-Supported Collaborative Learning, 4*(1), 47–68.

Gürbüz T., Yıldırım S. & Özden M. Y. (2001). Comparison of on-line and traditional computer literacy courses for preservice teachers: A case study. *Journal of Educational Technology Systems, 29*, 259-270.

Harris, C., Straker, L., Pollock, C., & Smith, A. (2015). Children, computer exposure and musculoskeletal

outcomes: The development of pathway models for school and home computerrelated musculoskeletal outcomes. *Journal of Ergonomics, 58*(10), 1611–1623.

Howie, E. K., Coenen, P., Campbell, A. C., Ranelli, S., & Straker, L. M. (2017). Head, trunk and arm posture amplitude and variation, muscle activity, sedentariness and physical activity of 3 to 5 year-old children during tablet computer use compared to television watching and toy play. *Applied Ergonomics, 65*, 41–50.

Jarvis T. & Rennie L. J. (1998). Factors that influence children's developing perceptions of technology. *International Journal of Technology and Design Education, 8*, 261-279.

Jones, A. (1997). Recent research in learning technological concepts and processes. *International Journal of Technology and Design Education, 7*(1–2), 83–96

Johnson, J. E., & Christie, J. F. (2009). Play and digital media. *Computers in the Schools, 26*(4), 284–289.

Kelly, G., Dockrell, S., & Galvin, R. (2009). Computer use in school: Its effect on posture and discomfort in schoolchildren. *Work, 32*(3), 321–328.

Kılınç, S. (2015). *Okul öncesi çağındaki çocukların teknoloji kullanımı hakkında ebeveyn görüşlerinin incelenmesi* [Yayımlanmamış yüksek lisans tezi]. Dumlupınar Üniversitesi, Kütahya.

Kılıçer, K. (2008). Teknolojik yeniliklerin yayılmasını ve benimsenmesini arttıran etmenler. *Anadolu Üniversitesi Sosyal Bilimler Dergisi, 8(*2), 209-222.

Kortecamp K. & Croninger W. R. (1996). Addressing barriers to technology diffusion. *Journal of Information Technology for Teacher Education, 5* (1/2), 71-82.

Lea, K. A. (1999). Training middle school teachers to use technology in the classroom: Perception and practice. *Dissertation Abstracts International*, 195. (UMI No. 9941687)

Linebarger, D. L., & Piotrowski, J. T. (2009). TV as storyteller: How exposure to television narratives impacts at–risk preschoolers' story knowledge and narrative skills. *British Journal of Developmental Psychology, 27*(1), 47–69.

McDonald, R. L. M. (2002). Perceptions of preservice educators, inservice educators, and professional development personnel regarding effective methods for learning technology integration skills. *Dissertation Abstracts International*, 113. (UMI No. 3076251).

Mitchell, K. J., Finkelhor, D., & Wolak, J. (2003). The exposure of youth to unwanted sexual material on the Internet: A national survey of risk, impact, and prevention. *Youth & Society, 34*(3), 330-358.

Miles, M. B., & Huberman, M. A. (2016). *Nitel veri analizi* (S. Akbaba ve A. A. Ersoy, Çev.). Pegem.

Mistry, K. B., Minkovitz, C. S., Strobino, D. M., & Borzekowski, D. L. (2007). Children's television exposure and behavioral and social outcomes at 5.5 years: Does timing of exposure matter. *Journal ofthe American Academy of Pediatrics, 120*(4), 762–769.

Mustafaoğlu, R., Zirek, E., Yasacı, Z., & Özdinçler, A. R. (2018). Dijital teknoloji kullanımının çocukların gelişimi ve sağlığı üzerine olumsuz etkileri. *Addicta: The Turkish Journal on Addictions*, *5*(2), 1-21.

Oktay, A. (2007). *Yaşamın sihirli yılları: Okul öncesi dönem*. Epsilon Yayınları.

Olson, J. K. (2013). The purposes of schooling and the nature of technology: The end of education. In M. P. Clough, J. K. Olson, & D. S. Niederhauser (Eds.), *The nature of technology implications for learning and teaching* (pp. 217–248). Sense Publishers.

Ornstein, A. C., ve Lasley, T. J. (2000). *Strategies for effective teaching.:* The McGraw-Hill Companies.

Önal, N. (2014). *Ortaokul matematik öğretmenlerinin bilişim teknolojileri yeterliliklerine ilişkin görüşleri.* [Yayımlanmamış doktora tezi]. Gazi Üniversitesi, Ankara.

Özkan, B. (2017). Anne görüşlerine göre 5-6 yaş çocukların bilgisayar/tablet kullanım düzeyleri. *The Journal of Academic Social Science, 5*(54), 390-399

Pagani, L. S., Fitzpatrick, C., Barnett, T. A., & Dubow, E. (2010). Prospective associations between early childhood television exposure and academic, psychosocial, and physical well-being by middle childhood. *Archives of Pediatrics & Adolescent Medicine, 164*(5), 425–431.

Ritchie D. & Rodriguez S. (1996). School administrators and educational technologies: Narrowing the divide. *Journal of Information Technology 198 for Teacher Education, 5*(1/2), 107-114.

Rohaan, E. J., Taconis, R., & Jochems, W. M. (2010). Reviewing the relations between teachers' knowledge and pupils' attitude in the feld of primary technology education. *International Journal of Technology and Design Education, 20(*1), 15–26.

Rosen, L. D., Lim, A., Felt, J., Carrier, L. M., Cheever, N. A., Lara-Ruiz, J., & Rokkum, J. (2014). Media and technology use predicts ill-being among children, preteens and teenagers independent of the negative health impacts of exercise and eating habits. *Computers in Human Behavior, 35*, 364–375.

Senemoğlu, N. (2001). *Gelişim, öğrenme ve öğretim*. Gazi Kitabevi.

Sırakaya, M. (2019). İlkokul ve ortaokul öğretmenlerinin teknoloji kabul durumları. *İnönü Üniversitesi Eğitim Fakültesi Dergisi*, *20*(2), 578-590.

Siğirtmaç A., Yılmaz E. & Solak N., (2006). *Okulöncesinde verilen bilgisayar destekli eğitimin genel durumu ve öğretmen görüşleri*. Avrupa Birliği Sürecinde Okulöncesi Eğitimin Bugünü ve Geleceği Sempozyumu, KKTC / Girne, TÜRKIYE, ss.280.

Silverman, B. W. (2018). *Density estimation for statistics and data analysis*. Routledge.

Strasburger, V. C., Jordan, A. B., & Donnerstein, E. (2010). Health effects of media on children and adolescents. *Journal of the American Academy of Pediatrics, 125*(4), 756–767.

Su, X. & Ding, B. (2022). A phenomenographic study of Chinese primary school students' conceptions about technology. *International Journal of Technology and Design Education*, 1-39.

Toran, M., Ulusoy, Z., Aydın, B., Deveci, T. & Akbulut, A. (2016). Çocukların dijital oyun kullanımına ilişkin annelerin görüşlerinin değerlendirilmesi. *Kastamonu Eğitim Dergisi, 24*(5), 22–63.

Vedi, B. (2013). *İlk ve ortaokul yöneticilerinin bilgisayar teknolojisini kullanma düzeylerinin değerlendirilmesi* [Yayımlanmamış yüksek lisans tezi]. Okan Üniversitesi, İstanbul.

Yılmaz, E. (2016). Okul öncesi öğretmenlerinin özyeterlik inançları ve teknolojik araç-gereç kullanımına yönelik tutumları: Balıkesir ili örneği. *Anadolu Journal of Educational Sciences International*. *6*(1), 1-26.

Wethington, H., Pan, L., & Sherry, B. (2013). The Association of screen time, television in the bedroom, and obesity among school–aged youth: 2007 National Survey of Children's Health. *Journal of School Health, 83*(8), 573–581.

Whetstone L. & Carr-Chellman A. (2001). Preparing preservice teachers to use technology: Survey results. *Tech Trends for Leaders in Education and Training, 46*, 11-17.