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Development of 21st century skills during preschool period: A phenomenological study in Türkiye

Duygu ÇETİNGÖZ

Department of Preschool Education, Buca Faculty of Education, Dokuz Eylül University, Türkey.

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The aim of this qualitative study is to investigate experiences of master's students regarding children's development of 21st century skills during preschool period in Türkiye. This is a phenomenological study. Purposeful sampling technique was applied in the forms of convenience sampling and criterion sampling. The data for this study was collected from four preschool teachers who were also master's students attending the Department of Preschool Education at a university in İzmir, Türkiye during spring 2021-2022. The data were collected through a Demographic Information Form and an Interview Form. Face-to-face interviews were conducted with the participants using a semi-structured interview form, and the data were analysed through content analysis technique. Based on the participants' experiences regarding the development of 21st century skills of preschool children, all participants' stated creative thinking techniques as a 21st century skill, and all stated technology based activities as a way of developing children's 21st century skills. All of them also expressed digital literacy skills of teachers as a teacher quality which develops students' 21st century skills and expressed family control over children's usage of technology as a responsibility of families. They all acknowledged that schools' technological infrastructure and conditions are often inadequate for teaching children 21st century skills, and suggested the preparation of an activity guide which teaches 21st century skills to children as a solution. The findings indicate that the participants have some knowledge regarding the development of 21st century skills in children and have designed activities based on this knowledge to help children acquire these skills during their preschool period. However, they faced certain difficulties while designing and implementing these activities. They also all emphasized their experiences regarding children's acquisition of technological skills. This study aims to reveal the professional experiences of preschool teachers regarding the development of children's 21st century skills, explain the present situation and activities that teachers design, display difficulties encountered during teaching, and explain the needs of preschool teachers.

Key words: preschool period, 21st century skills, master's students attending preschool education program, experiences.

INTRODUCTION

Changes in several aspects of life have created a need for individuals' acquisition of 21st century skills. Education for 21st century skills aims to equip students with the necessary knowledge and skills in case they encounter unexpected situations in their daily lives as well as in their professional lives (Altınpulluk and Yıldırım, 2021; Larson and Miller, 2011; Scott, 2015). The new millennium requires individuals to adapt and employ

several skills called 21st century skills, and those skills are cooperation, critical thinking, communication, creativity, technology literacy, cultural skills and problem-solving skills (Allen and Van der Velden, 2012). In this respect, it is important to integrate 21st century skills into education and to present activities to learners for them to internalise. The expectation for education to include 21st century skills affects the organization of educational policies, educational environment and curriculum design including that of preschool education (Altınpulluk and Yıldırım, 2021; Anagün et al., 2016; Eryılmaz and Uluyol, 2015; Güngör, 2021; P21, 2019b; Topçu and Çifçi, 2018; Turiman et al., 2012; Voogt and Roblin, 2012). As a requirement of becoming a developed community, it is important that students acquire 21st century skills. Also it is important to present a variety of activities in 21st century skills programs to students from all ages and grade levels both at the national and international levels (Partnership for 21st Century Skills (P21) 2019; Tuğluk and Özkan, 2019).

National Research Council (2011) categorizes 21st century skills under cognitive skills, interpersonal skills and personal skills categories. Partnership for 21st Century Skills (P21) (2019) categorized them as a) learning and innovation skills, b) information media and technology skills, c) life and career skills. In addition, Kennedy and Odell (2014) view 21st century skills as life and career skills and explain them as global awareness, information and media literacy, leadership, responsibility, communication, productivity, technology literacy, creativity problem solving, and critical thinking skills. As far as literature regarding the categories of 21st century skills is concerned, it is clear that similar characteristics are stated in general, and it is aimed to equip individuals with the adoptation skills to meet the needs of the century. Also, Turkish Ministry of National Education Quality Framework shares common ground with Framework for 21st Century Project in the USA in terms of basic 21st century skills like learning and innovation skills, information, media and technology skills and life and career skills (Gelen, 2017).

It is emphasized that 21st century skills (critical thinking, collaboration, communication, creativity, technology literacy, and social-emotional skills) that preschool children learn are very critical for both their education and for their lives in general (P21, 2019a; P21, 2019b). Important 21st century skills which preschool children are intented to be equipped with by Partnership for 21st Century Skills can be classified as follows; a) learning and innovation skills (creativity and innovation, critical thinking, problem solving, communication, collaboration) b) life and career skills (entrepreneurial skills and self-direction, social and cross-cultural skills, productivity and accountability, leadership and responsibility) c) information- technology and media skills (information literacy and media literacy) (2019b). Similarly, Yalçın et al. (2020) research, conducted in Türkiye regarding 21st century skills that preschool children can acquire, classified them as life and professional skills, learning and innovation skills and information, media and technology skills.

Among 21st century skills, it is predicted to develop individuals' critical thinking, problem solving, communication and collaboration skills that are under creativity and innovation skills during preschool period (Kerdthaworn and Chaichomchuen, 2021; P21, 2019b; UNICEF, 2019). Generally, STEM, cooperative learning, game activities, philosophy activities, creative activities and technology-based activities etc. are employed during preschool period to develop children's creativity and innovation skills (Ata-Aktürk, Demircan, Şenyurt and Çetin, 2017; Cheyne and Rubin 1983; Daniel et al., 2012; Liu et al., 2013; Fessakis et al., 2013; Häkkinen et al., 2017; Karadağ and Demirtaş, 2018; Nam et al., 2010; Siew et al., 2017; Zahra et al., 2013). It is stated that education is an important factor for the development and active implementation of critical thinking, which is viewed as the evaluation of reality, information and claims in terms of their values. Therefore, education for critical thinking skills should be offered during early ages for individuals to employ them for the rest of their lives. Especially philosophical activities during preschool period support the development of this skill (Daniel and Auriac, 2011; Karadağ and Demirtaş, 2018; Lewis and Smith, 1993; Şenşekerci and Bilgin, 2008). It is required for learners to conjoin their expertise and opinions while cooperating to solve problems and to create new information during cooperative learning, which is important for being successful in the information society of the 21st century. In this context, cooperative learning requires the employment of social skills and skills for working in coordination with other learners both during formal education activities and daily learning activities (Barfield, 2016; Häkkinen et al., 2017). It is emphasized that 21st century skills like critical thinking and problem solving can be developed, and qualified individuals can be raised through STEM education during early childhood (Akçay-Malçok and Ceylan, 2022; Bertrand, 2019; Erol et al., 2022; Simoncini and Lasen, 2018; TÜSİAD, 2017). In addition, P21 states (2019b) children can develop their 21st century skills through several creative activities like art, writing, drawing, sculpture, drama, creative activities and social games, dance, movement and scientific discoveries.

E-mail: duygucetingoz@gmail.com.

Life and career skills under 21st century skills that preschool children are wanted to acquire are classified as flexibility and adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability and leadership and responsibility. Examples of life and career skills in class atmosphere can be given as follows; a) flexibility and adaptability; fulfilling class responsibilities, easy adaptation to different tasks given in a day, asking questions to learn more and giving answers to questions b) initiative and self-direction; going through every step one by one in order to complete a task or an activity, accepting others' creative propositions and applying them, planning an imaginary game c) social and cross-cultural skills; being sensitive to others' needs, sharing materials, giving negative answers in a suitable manner d) productivity and accountability; explaining steps in order to play a game or to share an activity, seeking for more challenging activities, trying new experiences in an independent and secure manner, e) leadership and responsibility; participating in group discussions, using strategies in order to get assistance from adults and peers, starting new games with other children (Cahill, 2017; Elçi, 2021; Estes, 2016; P21, 2019b; Trilling and Fadel, 2009, as cited in Dinler et al., 2021:283).

Skills such as information technology and media skills - 21st century skills- have gained importance because of recent technological developments. Rapid changes in technology increased the number of technological devices used in preschool education and facilitated access to information. Today technological devices and interactive technologies such as televisions, projectors, computers, smart boards, smart phones, tablet computers, barcode readers as well as games that simulate real life, digital cameras, DVD and music players, recorders, electronic toys, e-book readers and digital content from Internet can be used for preschool education (Epstein, 2015; Güngör, 2021; Kardeş, 2020; Orçan et al., 2017; Plowman and Stephen, 2013; NAEYC, 2012). It is important how information is structured in the learning outcomes of information technology, media skills (information and media literacy), 21st century skills that preschool children are wanted to acquire. It should be emphasized here that individuals should employ several thinking skills in order to find information, attribute meaning to the information, find relationships, use, transform and reproduce it while they employ technological skills at the same time (Anagün et al., 2016; Güngör, 2021; Harari, 2020; P21, 2019b).

Therefore, the objective is both to provide enough technological hardware as well as to trigger their mental skills by combining this hardware with effective educational processes for them to produce quality information. In this respect, Turkish National Ministry of Education's Movement to Increase Opportunities and Technology (FATİH) Project provides smart boards, Internet access, e-content and tablets to students and teachers including preschool level. In service trainings were planned for teachers to use these technologies effectively. In this way, information technology skills and media skills were tried to be supported through FATİH Project (Eryılmaz and Uluyol, 2015).

A longitudinal study conducted by Sylva et al. (2020) regarding development of 21st century skills during preschool period determined that process quality supports the development of self regulation and prosocial behavior -21st century skills- which support the success of individuals during school and after school years. In this context, it can be said that preschool education period is a critical era for the acquisition of 21st century skills (Çetin and Çetin, 2021; Şimşek and Tuğluk, 2021). Therefore, children's acquisition of 21st century skills starting from preschool years will facilitate children's adoptation of todays' needs, will enable them acquire technological skills and will facilitate their openness to innovation and be successful individuals in the future (Auld and Morris, 2019; Eryılmaz and Uluyol, 2015; Kardeş, 2020).

In this respect, investigation and explanation of which 21st century skills that preschool students can acquire, how students can acquire them and which factors are important during preschool educational process are thought to be important.

One research investigating studies conducted on 21st century skills stated that studies emphasize the importance of conducting research with students from lower grades. In addition, it is stated that students' acquiring 21st century skills would contribute their professional lives and social lives in the future (Düzgüner et al., 2022). Another research, surveying the Web of Social Science Citation Index (SSCI) published during 2010-2019, stated that the number of studies investigating preschool children's 21st century skills is very small (Altınpulluk and Yıldırım, 2021).

This research aims to describe how master's students at Department of Preschool Education perceive children's development of 21st century skills during preschool period, difficulties that can arise during this process and their opinions on how to cope with these difficulties based on their teaching experiences and perception processes. In this respect, it is found important to explain the views of master's students at Department of Preschool Education in a university in Türkiye concerning the development of 21st century skills during preschool period in detail based on their experiences and perceptions with children. It is hoped to clarify children's development of 21st century skills during preschool period which are viewed as important skills today and to contribute to the related literature.

LITERATURE REVIEW

Preschool period is significant for children's acquisition of

21st century skills, and research has been conducted regarding this topic (Altınpulluk and Yıldırım, 2021; Auld and Morris, 2019; Chen and Chang, 2006; Çetin and Çetin, 2021; Danyi, 2002; Düzgüner et al., 2022; Elçi, 2021; Eryılmaz and Uluyol, 2015; Güney-Manavoğlu, 2022; Güngör, 2021; Haugland, 2000; Kardeş, 2020; Kamalodeen et al., 2017; McCarick and Xiaoming, 2007; Sylva et al., 2020; Şimşek and Tuğluk, 2021). It is stated that the number of studies regarding 21st century skills of preschool children and how to develop them is limited in Türkiye (Düzgüner et al., 2022; Elçi, 2021; Güney-Manavoğlu, 2022; Güngör, 2021). Studies in literature cover individual skills such as problem solving, creativity and critical thinking rather than focusing 21st century skills in general during preschool period (Karadağ and Yıldız Demirtaş, 2018; Tavlı, 2007; Yaşar and Aral, 2010; Yuvacı and Dağlıoğlu, 2018).

Sylva et al. (2020) research stated that the sustainability of quality of education during preschool period contributes the development of selfregulation and prosocial behaviors which are among the 21st century skills that affect the future success of individuals. Auld and Morris (2019), defining early childhood education for 21st century education in their research, emphasized the role of children's cognitive skills and children's role as a source for human capital in the future after comparing cognitive test results of 5-year-old children in three different countries. Cloney and Picker (2019) investigated what early childhood education taught in terms of curriculum and early childhood settings in Australia in regard to 21st century skills. They stated early childhood education curriculum and settings are in line with 21st century skills, and the development of social emotional skills are given the most importance. Kamalodeen et al. (2017) intented to develop preschool teachers' ICT competence and confidence in regard to usage of Web 2.0 tools in a STEM professional development initiative and stated that teachers' competence increased in dijitally rich settings. McCarick and Xiaoming (2007) investigated emprical research in literature conducted between 1985-2004 regarding the effects of computer usage on young children's social, cognitive, language development and motivation. Haugland (2000) conducted a research regarding the usage of computers in classes in order to increase learning in the 21st century during preschool education. This study focused on how computers can be used in order to increase young children's learning in educational settings. It can be said that more studies are needed abroad on the development of preschool children's 21st century skills, and Altınpulluk and Yıldırım (2021) points out the gap in the literature in SSCI regarding this topic. Güney-Manavoğlu (2022) wanted to determine, from the perspective of preschool teachers, which 21st century skills preschool teachers wanted their students to acquire and which educational activities they designed to teach them in Türkiye.

It was revealed that teachers mostly organise drama activities, STEM, mind games, traditional games, modeling, cooperation with families, story books and artistic activities in order for children to acquire these skills.

Elçi (2021) studied the relationship between preschool children's 21st century skills and their competition styles which found out that children of low income families have lower scores of 21st century skills comparing to children of middle or high income families. They also found that 21st century skills and competition scores of children attending preschool for longer than two or more years are higher than that of children who are first year students. In addition, it was found that 21st century skills scores of children whose mothers are working are higher than those whose mothers are not working.

The higher 21st century skills scores of children get the competition scores of children increase, and the higher competition scores of children get their 21st century skills scores increase. Çetin and Çetin (2021) conducted a research on Preschool Education Curriculum and activity book prepared by National Ministry of Education 2013 in terms of 21st century skills, and they concluded that information, media and technology skills did not exist in the preschool curriculum and activity book. However, the curriculum and the book support learning and innovation skills as well as life and career skills among the 21st century skills. Some research was also conducted regarding the development of measuring tools for the measurement of 21st century skills during preschool period. Simsar et al. (2020) conducted a validity and reliability research of "21st Century Skills Scale" for 3-4 year old children. A similar study was conducted by Yalçın et al. (2020) who developed a scale to measure 21st century skills of 5-6 year old children. Reliable and valid 21st century skills scales were developed as a result of both studies. It is observed that studies regarding 21st century skills of especially preschool children in Turkiye is limited. However, there are research results indicating the importance of educational processes for the development of 21st century skills during preschool period. The importance of conducting more research regarding the development of 21st century skills during preschool period came into light as a result of the previous research. Therefore, it is thought that investigation of experiences of preschool teachers, attending a masters' program on preschool education, regarding the development of children's 21st century skills during preschool period in Türkiye is important. Based on teachers' own professional experiences in regard to 21st century skills the results of this research is hoped to contribute the explanation of the present situation and the present teacher activities as well as to reveal difficulties that teachers endure and their needs at schools.

The aim of this research is to investigate the experiences of preschool teachers who are also masters' students in terms of the developments of children's 21st century skills during preschool period in Turkiye. The

problem statement of this research is “What kind of experiences do masters’ students attending preschool education program go through in regard to the development of 21st century skills during preschool period?” The following sub problems are also chosen.

Sub problems

1. What are 21st century skills that they want students to develop during preschool period based on the experiences of masters’ students studying Preschool Education Program?
2. What are the experiences of masters’ students attending Preschool Education Program regarding the process of children’s development of 21st century skills during preschool period?
3. What are the experiences of masters’ students attending Preschool Education Program regarding the difficulties during the process of children’s development of 21st century skills during preschool period?

METHODOLOGY

Research design

The aim of this qualitative research is to investigate the experiences of preschool teachers, who at the same time attend the masters’ program in Department of Preschool Education, in regard to development of preschool children’s 21st century skills in Turkiye. This is a phenomenological research following the qualitative research pattern in which qualitative data collection methods are used which reflect cases and perceptions in their natural settings with a holistic attitude (Yıldırım and Şimşek, 2008). The most important aim of the phenomenological design is to describe cases, situations, perceptions and experiences that people go through (Yıldırım and Şimşek, 2008), and this phenomenological research, based on the participants’ awareness of this phenomena, aims to reveal opinions and experiences of the participants’ regarding the development of 21st century skills of children during preschool period. Therefore, face-to-face interviews were conducted through semi structured interview questions with preschool teachers who are attending Preschool Education master’s program in order to gather detailed information regarding their experiences about this phenomenon.

The subjects were chosen via two methods named convenience sampling and criterion sampling which are among the purposeful sampling techniques. Convenience sampling is employed for practical reasons to generate data in a short time from a convenient group who are available and easy to reach (Patton, 2002; Yıldırım and Şimşek, 2008). The first step was to reach all 12 masters’ students attending the Department of Preschool Education in an university in İzmir during 2021-2022 Spring semester in order to determine the participants. Then, criterion sampling method, one of purposeful sampling methods, aims to include cases which meet the criterion or criteria determined by the researcher to investigate (Patton, 2002; Yıldırım and Şimşek, 2008) was applied. Therefore, the second step was to select 4 masters’ students who comply with the criteria of being a preschool teacher in a state school. The remaining 8 masters’ students out of 12 did not have any work experience as preschool teachers, therefore they were not selected.

Literature was consulted in order to decide how many participants to be selected in this research. Onwuegbuzie and Leech (2007) state that some researchers emphasize research design determines the number of participants to be selected. Literature regarding phenemonological research indicates 3-4 participants can be employed (Creswell, 2015).

In addition, this research employed the principles of “focus of the research” and “data saturation” while determining the number of participants (Creswell, 2015; Cropley, 2002, as cited in Yıldırım and Şimşek, 2008:114). Since the focus of this research is preschool teachers who have knowledge and understanding regarding what 21st century skills are and how to develop them during preschool period, the participants were selected among masters’ students who passed the entrance exam to be become a master’s student and who have been receiving further education. The sample size was determined as 4 participants due to the design and criteria of the research. This situation can be said as the limitation of the research. The number of participants is also acceptable from the data saturation point of view since the aim is to collect in-dept views of the master’s student participants in this phenemenological design. In addition, data from the in-dept interviews with the participants resulted mostly in the creation of same codes and themes.

Participants

The participants are four female students attending the master’s program at Department of Preschool Education in a university in Türkiye during 2021-2022 Spring Semesters, and all four of them qualify for the criteria to participate. All participants are graduates of Department of Preschool Education. Their GPAs range between 3.30-3.40, and they work as preschool teachers in independent preschools under the supervision of National Ministry of Education or in preschools of elementary schools. Their work experience also ranges between 3 months to 2 years.

Data collection and data analysis

The data were collected through a demographic information form and an interview form. The interview questions were prepared after an extensive literature review. Also two experts reviewed the questions and gave feedback in order to provide validity. The final questions suggested by the experts were included in the semi structured interview form. Face-to-face interviews were conducted by the researcher during 2021-2022 Spring Semester and each interview took approximately 30 minutes. Additional questions were also used during the interview process depending on the need. The interviews were conducted at the researcher’s office at the Faculty of Education. The questions are as follows:

1. What are 21st century skills that students are wanted to acquire during preschool period?
2. What kind of activities would be effective in order to develop 21st century skills of students during preschool period?
3. What could the factors which support the acquisition of students’ 21st century skills during preschool period?
4. What do you think the difficulties could be during students’ acquisition of 21st century skills during preschool period?
5. What are your proposed solutions for difficulties experienced during children’s acquisition of 21st century skills during preschool period?

The answers given by the master’s students attending Department of Preschool Education were written down, and their answers were confirmed in order to avoid any possible loss of data. The data were analyzed via content analysis method. It is aimed to form concepts and connections (relations) which can explain the data during content analysis procedure. The content analysis procedure of this

Table 1. Sub-theme and code regarding 21st century skills during pre school period theme.

Theme	Sub-theme	Code	Participants
21st century skills during preschool period	Learning and innovation skills	Creative thinking skills	S1, S2, S3,S4
		Different thinking skills	S1, S2, S3
	Life and career skills	Social skills	S2, S3, S4
	Information, media, and technology skills	Digital literacy skills	S1, S2, S4

Source: Author

qualitative research included coding the data, determining themes, organizing data under themes, assigning codes to the data, and explanation and interpretation of the findings (Yıldırım and Şimşek, 2008). As a result of the analysis of the data, 4 themes and 10 sub-themes were reached. In the explanations below, information is given about the necessary conditions (Erlandson et al., 1993, as cited in Yıldırım and Şimşek, 2008:262; Miles and Huberman, 1994) to ensure the validity and reliability of the data.

Validity and reliability of the research

The necessary conditions should be met in order to achieve validity and reliability of a qualitative research (Yıldırım and Şimşek, 2008; Miles and Huberman, 1994; Lecompte and Goetz, 1982), and this research also paid attention to achieve this. For the credibility of the research, first of all, while determining the questions in the interview form, the literature was closely examined, and the opinions of two experts were asked, and some changes were made in the questions in line with their suggestions. In addition, pre-interviews were held with two graduate students to decide how well the questions serve the purpose. After these interviews, some changes were made to give the form its final shape. Face-to-face interviews were conducted with the participants. The data obtained at the end of each interview were summarized to the participants. In order to ensure the transferability of the research, meaningful stacks were tried to be obtained through codes and themes with the findings obtained. The research process was explained in detail, the purposeful sampling method was used, examples of direct quotations are included and the details about how validity and reliability of the research were achieved were explained.

The codings conducted by the researcher were repeated after a certain time frame in order to provide trustworthiness. In this respect, the formula offered by Miles and Huberman (1994) was employed in order to provide coding reliability.

The formula was Consensus/Consensus+DisagreementX100. The minimum reliability should be expected to be 80% (Miles and Huberman, 1994). The reliability of the codes in this research was found to be 90%. In Furthermore, the status of the participants and the researcher were described, the opinions of the participants were confirmed by them, and the interview and analysis procedures were explained in detail in order to provide confirmability of the research. The codes created depending on the experiences and the participants in these codes were checked.

FINDINGS

The following tables explain the results regarding the opinions of master's students studying at Department of Preschool Education regarding children's development of 21st century skills during preschool period. The letter (S) is used as the abbreviation for student. Table 1 presents theme regarding 21st century skills during preschool period, sub-themes and codes determined after data analysis.

As seen in Table 1, there are learning and innovation skills, life and career skills, information, media, and technology skills sub-themes and codes under the theme of "21st century skills during preschool period". In Table 1, it is seen that all participants expressed "creative thinking skills" under the learning and innovation skills for the theme of "21st century skills during preschool period". One comment on this was: "*It is important for a preschool child to gain creative thinking skills in order to achieve 21st century skills"* (S1). Another participant (S2) also said *"Supporting the development of creative thinking skills of children as 21st century skills will enable them become more successful in future"* which was placed under the theme. Most of the participants voiced opinions regarding "social skills" under the life and career skills, "digital literacy skills" under the information, media, and technology skills and "different thinking skills" under the learning and innovation skills. Regarding "social skills", two participants said "*Supporting children's development of social skills will facilitate their adjustment to teamwork which is one of 21st century skills"* (S3) and "*It is important to make students acquire social skills which are among 21st century skills during preschool period"* (S4). Regarding "digital literacy", the participants said "*Among 21st century skills, development of computer and technology usage skills of preschool children will be beneficial because they will need to employ these skills both in their educational lives and in their daily lives in future"* (S4). *"It is inevitable that children will learn to use computers in this century"* (S1). Regarding "different thinking skills", one participant stated *"It is important for preschool students to see problems and to be able to create solutions to these problems as 21st century skills"* (S2).

In addition, regarding the importance of preschool children's acquiring "different thinking skills" as 21st century skills during preschool period, the participants stated that these skills are effective on children's points of views on daily events. One participant, (S3), said:

"*Analytical thinking as a 21st century skill facilitates children's seeing daily events in a cause-effect relationship".* (S4), also said "*Children's ability to view*

Table 2. Sub-Theme and code regarding educational applications that develop children's 21st century skills during preschool period theme.

Theme	Sub-theme	Code	Participants
Educational applications that develop children's 21st century skills during preschool period	Activities	Technology based activities	S1, S2.S3,S4
		Project activities	S1, S2, S3
		STEM activities	S1, S2, S3
		Art activities	S1, S3
		Science activities	S1, S3
		Drama activities	S1, S4
		Game activities	S2
		Book reading activities	S4
	Methods and techniques	Creative thinking techniques	S2, S3, S4
		Problem solving techniques	S1, S2, S3
		Question-answer technique based on open ended questions	S2, S4
		Cooperative learning method	S1
		Station technique	S4

Source: Author

daily events from a multidimentional point of view, as a 21st century skill, should be developed during preschool period".

Table 2 presents themes regarding educational activities that develop children's 21st century skills during preschool period, sub-themes and codes determined after data analysis. As seen in Table 2, there are activities, methods and techniques, sub-themes and codes under the theme of "educational practices that develop 21st century skills of children during preschool period".

In Table 2, it is seen that all participants expressed "technology-based activities" in the activities under the theme of "educational practices that develop children's 21st century skills". One participant, emphasizing "technology-based activities", said "*Both abstract concepts become concrete for students, and also their development of 21st century skills is also supported through technology usage in class since students are at preoperational period*." (S4). Another participant (S2) said *"Coding activities or computer technologies develop their 21st century skills, and they enjoy learning since children view these activities as games. Drama and game activities, during which they are more actively involved, also support the development of these skills. Especially, their creative thinking skills and social skills develop".* One participant who gave opinion in the "project activities" (S3) said "*Children who are doing group work approach a problem and try to solve it with different perspectives during project activities"*. Similarly, another participant, (S1), who stated 21st century skills can be developed through "project activities" said that *"Since students decide how to solve a problem by working in groups during project activities their social skills and different thinking skills develop."* One participant (S2) voicing opinions in the "STEM activities" said *"STEM develops preschool children's social skills and creative thinking".* Another participant (S4) also talked about "STEM activities" and stated *"Children's critical thinking and problemsolving skills develop starting from preschool period as a result of STEM activities".* (S3) talking about "science activities", said *"Enabling children make predictions and inferences during experiments develops their 21st century skills".* The same participant also said "*Asking questions which enable them think without any limitations or any fixed methods, and guiding them to make observations during art activities support these skills."* Another participant, (S1), voiced opions about the "drama activities" and said *"Drama activities develop children's thinking and communication skills".* One participant, who emphasized that "book reading activities" support children's development of 21st century skills, said *"Asking children to predict what happens next or asking them to finish the book with a different ending may develop children's thinking skills"* (S4).

The majority of the participants emphasized "creative thinking techniques" and "problem solving techniques" in the "methods and techniques" under the theme of "educational practices that develop children's 21st century skills". One participant, whose opinon was placed under "problem solving techniques", said *"It is effective to employ problem solving techniques in order for students to acquire 21st century skills. Students are generally active although individual support is needed from time to time"* (S1).

Another participant, (S3) said *"21st century skills can be developed by supporting the employment of creative*

Table 3. Sub-theme and code regarding supporting children's acquisition of 21st century skills during preschool period theme.

Theme	Sub-theme	Code	Participants
Supporting children's acquisition of 21st century skills during preschool period	Teacher characteristics	Having digital literacy skills	S1, S2, S3,S4
		Providing guidance	S2, S3, S4
		Effective ıntegration of technology and activity process	S1, S2, S4
		Being creative	S1, S2, S3
		Acceptance of ındividual differences for 21st century skills	S1, S4
		Keeping up with professional innovations	S3
	Responsibilities of the family	Exerting technology control on children	S1, S2, S3, S4
		Teaching children to use technology in a beneficial way	S1, S2, S4
		Supporting children's creativity	S1, S2, S3
		Supporting 21st century skills at home	S4
	21st century skills in preschool education program in Türkiye	The curriculum is not adequate	S1, S2, S3
		The outcomes and performance indicators regarding technology skills are not adequate in the curriculum	S1, S2, S3
		The curriculum is sort of adequate	S4
		The outcomes and performance indicators regarding 21st century skills are not adequate in the curriculum	S1
		The flexibility of the curriculum which supports 21st century skills	S4

Source: Author.

thinking techniques. Children are able to use the technique when provided guidance". Another participant (S2) whose opinion was also placed under "creative thinking techniques" stated *"Scamper technique is effective for developing creative thinking".* Also, (S3) said "*We can work on problem situations in which children can use problem solving techniques".*

One participant who commented regarding "question-answer technique based on open ended questions" stated *"Using question-answer technique based on open ended questions during classroom activities is effective to support reasoning for developing 21st century skills"* (S4). (S1), giving a statement in the "cooperative learning" said *"Children's social skills develop while working on cooperative learning groups".* Another participant (S4), who commented on "Station Technique", said *"Station technique supports the development of children's different thinking skills. Children will develop different thinking strategies suitable to each different station".* The following Table 3 presents themes regarding supporting children's acquisition of 21st century skills during preschool period, sub-themes and codes determined after data analysis.

As seen in Table 3, teacher characteristics, responsibilities of the family, 21st century skills in preschool education program in Türkiye are sub-themes and codes under the theme of "supporting children's acquisition of 21st century skills during preschool period". In Table 3, it is seen that all participants expressed "teachers' owning digital literacy skills" in the teacher characteristics under the theme of "supporting children's acquisition of 21st century skills during preschool period". In line with this, one participant said *"A preschool teacher should be able to use technology effectively. For example, there are smart boards in most classrooms, and yet some teachers never use them. A teacher's willingness to use technological innovations is necessary from 21st century point of view"* (S4). Another participant stated *"Being a preschool teacher who keeps up with technological innovations and being open to new developments are among the characteristics of being a teacher who develops children's 21st century skills"* (S3). Most of the participants used the expressions "guidance", "effective integration of technology and activity process" and "being creative" for teacher characteristics in the theme of "supporting children to acquire 21st century skills during preschool period".

As seen from Table 3, one participant said *"Teachers' giving an opportunity to children's self learning during preschool period and providing guidance to them when they need it is a way to develop childrens' 21st century skills" (S2)* regarding providing guidance. Also, (S4), emphasizing teachers' role as a guide, stated *"By being a guide, teachers should support children's cognitive apprenticeship". Teachers should support children's cognitive apprenticeship".* Concerning effective integration of technology and activity process, (S4) stated *"Using technology in classroom positively affects children's development of 21st century skills but smart boards are not for using the Internet only, the most important thing is*

teachers' having adequate knowledge on how to combine this technology with activities". Regarding "effective integration of technology and activity process", another participant, (S2) also stated "*Activities that I combine games with technology become very entertaining and fruitful since children are preschool age. For example, I use games developed by coding while teaching colors. Sometimes I make them listen to stories using technology and sometimes I make them watch videos suitable to the content of the activity and we talk about the video afterwards".* (S1), mentioned creativity under "characteristics of teachers who support children's acquisition of 21st century skills", and said *"It is important for a preschool teacher to be creative, for example, a teacher should be a role model for their students by being curious and being open to discoveries, having questioning skills and respecting different opinions".* Another participant, (S2) commented on and said *"A teacher should be flexible and have creativity".* (S1) whose opinion was about "acceptance of individual differences as 21st century skills" said *"Similar to the development of all skills, a preschool teacher should provide students with a variety of activities by accepting students' individual differences and interests during their development of 21st century skills. For example, one student can acquire skills through drama activities more easily because h/she is interested in drama whereas another student acquire these skills through table games played in groups. The awareness of the teacher will positively affect children's acquisition of 21st century skills".* Another participant, (S3), commented on "keeping up with professional innovations" under "teacher characteristics that support children's acquisition of 21st century skills" and stated that *"Teachers should be professionally knowledgeable about up-to-date methods and activities in order to support the development of students' 21st century skills during preschool. It is necessary to be informed about techniques that develop creativity, and activities such as STEM and coding etc*".

All participants stated about "exerting technology control" with the concerning "responsibilies of family to supporting children's acquisition of 21st century skills during preschool period". One participant said *"In terms of 21st century skills, children's computer and Internet usage should take place with the condition of paying attention to some points. Families should be conscious of the children's computer and Internet usage"* (S1). Another participant, (S3), talking about the same code said *"Preschool children's starting to use technology is a 21st century skill. But the important thing is families' keeping track of how much time children spend on technology and taking the necessary precautions".*

The majority of the participants stated "teaching children how to use technology in a beneficial way" and" supporting children's creativity" under the "responsibilies of family" to support children's acquisition of 21st century skills during preschool period. One participant, (S2), talked about "teaching children to use technology in a beneficial way" and said *"Families should not leave children alone and on their own with technology and the Internet. Families should guide their children in that technology can be used for many purposes other than playing games".* Similarly, another participant (S4) also said *"Families should limit children's playing computer games and teach them that technology can be used for other purposes. For example, they can make their children watch documentaries appropriate to their age".* (S3) commenting on "families' supporting children's creativity" said *"Families should answer the questions that children ask openly and clearly and they should ask open ended questions which give them an opportunity to think in a multidimentional manner to support their creativity".* (S2), also talking about the supporting children's creativity, said *"Families should support their children's asking questions and should give them opportunities to think in order to foster their creativity".*

One participant, concerning "supporting children's 21st century skills at home", said that *"Supporting children's skills at home that they acquire at school is a valid approach for supporting their 21st century skills too. For example, children are away from school on the weekends and during long summer holidays, therefore their skills should be supported at home too"* (S4).

The majority of the participants stated "the curriculum is not adequate" and "the outcomes and performance indicators regarding technology skills are not adequate in the curriculum" under the "21st century skills in preschool education program in Türkiye" to support children's acquisition of 21st century skills during preschool period. One participant, (S3), commenting on "the curriculum is not adequate", said *"I think the curriculum is not adequate to develop 21st century skills of children because when we look at the skills that should be developed, the outcomes and performance indicators regarding technology skills are not adequate. In addition, the curriculum does not guide teachers in terms of activities concerning technology use such as coding activities".* Similarly, another participant commented and said *"The curriculum is not adequate. I think outcomes and performance indicators, concepts and material examples regarding skills on how to use technology should be added"* (S2).

Also another participant, (S1), voicing opinion on *"the outcomes and performance indicators regarding 21st century skills are not adequate in the curriculum"* stated *"The curriculum is not adequate. There should be an activity guide that explains how to put theoretical information into practice while teaching 21st century skills".* One participant who thinks "the curriculum is sort of adequate" said "*The curriculum is sort of adequate to teach 21st century skills because the curriculum is flexible. A teacher can benefit from the flexibility of the curriculum if s/he wants to develop these skills even if 21st century skills were not directly stated"* (S4). Table 4

Tablo 4. Sub-theme and code regarding difficult processes during children's acquisition of 21st century skills during preschool period theme.

Theme	Sub-theme	Code	Participants
Difficult processes during children's acquisition of 21st century skills during preschool period	Difficulties	Technological conditions of schools	S1, S2, S3, S4
		Teachers' level of readiness	S2, S3. S4
		Families' level of readiness	S1, S2
		Socio-demographic conditions	S1, S4
		That 21st century skills' being abstract	S3
		Teachers' guidebook that develop children's 21st century skills	S1, S2, S3, S4
	Solutions for difficulties	Family training	S1, S2, S3
		Improvement of technological infrastructure at schools	S1, S2, S3
		Teacher training	S1, S2, S4
		Addition of 21st century skills to preschool curriculum	S2, S4
		Investigation of how different countries teach 21st century skills during preschool period	S3

Source: Author

presents themes regarding difficulties that teachers face during children's acquisition of 21st century skills during preschool period, sub-themes and codes determined after data analysis.

As seen in Table 4, there are difficulties; solutions for difficulties are sub-themes and codes under the theme of "difficulties that teachers face during children's acquisition of 21st century skills during preschool period". In Table 4, it is seen that all participants expressed "technological conditions of schools" as the difficulties under the theme of "difficulties that teachers encounter during children's acquisition of 21st century skills during preschool period". Regarding this, one participant said "*The infrastucture and hardware is not adequate and technological materials are not available at schools*" (S3). Similarly, (S1) stated "*Technological conditions are limited in my classroom, for example I don't have a smart board. I try to do things with my own computer and with my own materials*". The majority of participants voiced opinions regarding "teachers' readiness". One participant (S4) stated *"No difficulties will be experienced during children's acquisition of 21st century skills if the activities are simple and age appropriate. Teachers may experience difficulties. Some teachers may be more closed to innovations".* Another participant (S2), commenting on, said *"Especially if a teacher is traditional they may experience more difficulties while children are acquiring 21st century skills or they may act in an authoritarian manner and may not push children into questioning. Some teachers may also be reluctant to use technology".* One participant, (S2), talking about "families' readiness" said *"Families can be our biggest problem. Families and teachers should stand parallel to each other while children are acquiring these skills".* (S1) also said *"Families' being informed about 21st century skills and their having 21st century skills are very important for children's development of these skills. But there are problems regarding this".*

One participant talked about "socio-demographical conditions" and said *"Families' of low education level and low income level is one of the problems faced while children are acquiring 21st century skills. This sometimes creates inequality of opportunity among students"* (S1). Another participant said *"Poor conditions can create difficulties in children's acquisition of 21st century skills. When I consider the schools I have taught so far I believe conditions create differences among children"* (S4). Another participant talked about "21st century skills' being abstract" and said *"That 21st century skills are abstract causes problems. Especially when adequate materials are not provided. Then those skills stay abstract for children" (S3).*As seen from Table 4, all participants expressed "teachers' guidebook that develop children's 21st century skills" in the solutions for difficulties under the theme of "difficulties in children's acquisition of 21st century skills during preschool period". Regarding this, one participant said:

"*Having supplementary curriculum to the existing*

curriculum or a curriculum which offers examples of activities that teachers can employ in their classes can reduce the difficulties that teachers experience" (S2). Similarly, another participant (S1) said "*Domains of development in the curriculum can be restructured by including 21st century skills. By doing so, teachers can know the outcomes and performance indicators that they have to teach for each skill".*

Also, majority of the participants talked about "family training", "improvement of technological conditions at schools", "teacher training", and "addition of 21st century skills to preschool curriculum". Talking about "family training", one participant said:

"*Family training concerning 21st century skills is important because children can attain equality of opportunity by this way"* (S3). Similarly, another participant (S2) said "*Parents should be informed about 21st century skills. The difficulties will decrease when they are more informed and more conscious about them".* One participant, (S3), talked about "improvement of technological conditions at schools" and said "*Technological conditions at schools should be improved. In addition, providing technological devices to all schools create equality of opportunity.* Similarly, (S1) said *"If I had a smart board in my classroom all the difficulties I experience while teaching these skills will be reduced".* One participant, talking about "teacher training", said

"Teachers should be given training regarding 21st century skills and how to teach them. For example, majority of the preschool teachers do not know about STEM activities that can be used to teach 21st century skills. Teachers should first be given training on how to teach them. They should believe the importance of children's development of these skills and turn children's interests into an opportunity to teach these skills" (S4).

A similar opinion was raised by (S1) who said "*If I have to make a self critisism, I have to confess I don't have enough knowledge about 21st century skills, and I would like to participate in training sessions on how to develop children's 21st century skills".* One participant, (S4) proposed the addition of 21st century skills to preschool curriculum and said "*The preschool curriculum is very general and open ended, therefore, the curriculum can be better if 21st century skills are added".* Similiary, (S2) talking about the same code, "*Educational outcomes and performance indicators that can be achieved through technology literacy, STEM and creative thinking techniques can be added to the preschool curriculum".*

One participant who suggested the "investigation of how different countries teach 21st century skills during preschool period" said "*How different countries teach 21st century skills during preschool period today can be investigated, and we can think about how we can adopt them in our country. Studies conducted on preschool education should be followed"* (S3).

DISCUSSION

In the discussion section, the research sub-questions were answered based on the research findings and the literature. Based on the participants' experiences, 21st century skills during preschool period will be discussed in this part of the research while supporting literature is provided.

21st century skills that they want students to develop during preschool period based on the experiences of masters' students studying Preschool Education Program

21st century skills during preschool period

All of the master's student participants stated "creative thinking skills" under the theme of "21st century skills during preschool period". Creative thinking skills also take place among 21st century skills during preschool period (P21, 2109a; P21, 2019b). In addition, majority of the participants talked about social skills, digital literacy skills and different thinking skills among 21st century skills and that shows similarity to the literature (Eckhoff, 2011; P21, 2109a; P21, 2019a; Yalçın et al., 2020). Today it is generally accepted that preschool children are not passive members of the digital world anymore (Rosen and Jaruszewicz, 2009). Young children today can access computers, the Internet, electronic games and communication technologies, and their necessary skills develop fast because technology is a part of their lives (Benner and Hatch, 2010; Sayar and Benli, 2020).

When the opinions of preschool master's student participants are viewed, it is seen that their views are generally in harmony with 21st century skills stated in the literature. Even though objectives concerning technological skills are not given in the preschool education curriculum in Türkiye the majority of the participants mentioned these skills which indicates that they have awareness regarding children's need to acquire them.

The experiences of masters' students attending Preschool Education Program regarding the process of children's development of 21st century skills during preschool period

Educational applications that develop children's 21st century skills during preschool period

All of the preschool master's student participants voiced

opinions regarding technology based activities under activities that develop children's 21st century skills during preschool period. Today it is important to improve education through usage of technology and employment of instructional technologies and innovation in order to meet new generation teaching expectations and the needs of the society (Erstad and Zounek, 2018; Harkins, 2008; Kocaman-Karoğlu et al., 2020; Nedeva and Dineva, 2012). Especially games play an important role in children's acquisition of digital skills during preschool period (Erstad and Zounek, 2018; Qian and Clark, 2016).

Employment of technology during preschool period supports children's development of self respect, self control, communication, collaboration, critical thinking, problem solving, effective usage of memory and technology which are among social and cognitive skills (Kangal-Bencik and Özkızıklı, 2015; Chen and Chang, 2006; Özdemir and Çetin, 2015; Shahrimin and Butterworth, 2002; Haugland, 2000; Klein et al., 2000).

That employment of technological devices in activities while preschool children are taught information-technology and media skills, which are among 21st century skills, is thought to be beneficial. Usage of technological activities during preschool education supports the development of several 21st century skills that preschool children are wanted to acquire (Haugland, 2000; Kamalodeen et al., 2017; Sayan, 2016; McCarick and Xiaoming, 2007; Chen and Chang, 2006).

It is thought that the use of technological devices within the context of activities related to information-technology and media skills, which are among 21st century skill areas, will be beneficial in helping children's acquisition of 21st century skills through activities during preschool period. The use of technology-based activities in preschool education supports the development of many 21st century skills expected to be acquired during this period (Haugland, 2000; Kamalodeen et al., 2017; Sayan, 2016; McCarick and Xiaoming, 2007; Chen and Chang, 2006).

Majority of the master's students of Preschool Education expressed their opinions about STEM activities and project activities under the theme of activities that develop 21st century skills during preschool period. STEM activities, namely science, technology, engineering and mathematics education, have taken their place on the global agenda to support 21st century skills such as communication, collaboration, problem-solving, and creative and critical thinking (Kamalodeen et al., 2017). Supporting the views of the participants of this research, it is stated in the literature that preschool period STEM education will provide the interdisiplinery training of students and have 21st century skills (Balat and Günşen, 2017; Erdoğan and Çiftçi, 2017; Erol, Erol and Başaran, 2022; Güntaş, Özdem and Çelik İskifoğlu, 2019).

At the same time, children cooperate and interact with each other and actively participate in activities through the use of Web 2.0 computer technologies during STEM activities, (Haugland, 2000; O'Reilly, 2007). Koyunlu-Ünlü and Dere (2019) stated that preschool teachers' awareness of STEM activities should be increased through laboratory practices and workshops in order to improve their knowledge and skills regarding STEM. Kennedy and Odell (2014), state that teachers should use innovative teaching materials to implement effective educational materials for STEM practices.

Preschool masters' students also stated that project activies are among those that develop children's 21st century skills. Literature also suggests similar results, and research suggests employment of project activities supports the development of children's 21st century skills (Bıçakçı, 2009; Danyi, 2002; Kurt, 2007).

Majority of the participants also included creative thinking techniques and problem solving techniques as methods and techniques that develop children's 21st century skills during preschool period. Similarly, research suggests education that supports children's creative thinking skills contributes children's development of creative thinking skills positively (Dziedziewicz and Karwowski, 2015; Hoffmann and Russ, 2016; İmran-Karadayı, 2018). Similarly, research concerning children's problem solving skills state that education given to support children's problem solving skills contributes children's problem solving skills positively (Akçay-Malçok and Ceylan, 2022; Bahar and Aksüt, 2020; Hong and Diamond, 2012; Kurupınar, 2022).

The experiences of the master's students about the educational applications that develop children's 21st century skills during preschool period generally contain similar information to the literature. However, when we look at the difficulties teachers experienced while teaching 21st century skills and their solutions to them it is seen that the participants want to receive training on how to develop children's 21st century skills effectively during the preschool period, both in theory and in practice.

Supporting children's acquisition of 21st Century skills during preschool period

All master's students studying preschool education expressed their experiences regarding having digital literacy skills in the theme of teacher characteristics that develop children's 21st century skills during preschool period. These views of master's students have been a subject of discussion in the literature. However, the results of different studies indicate that there are some problems in terms of teachers' usage of digital literacy skills. Häkkinen et al. (2017), state that teachers may experience inadequacies in their use of information and communication technologies in general. Similarly, Konca and Erden's (2021) research determine that Turkish preschool teachers have televisions, DVDs, computers and smartphones in their classrooms, and they generally prefer to use television and computers for activities. In addition, it is determined that preschool teachers'

attitudes towards using digital technology are positive,but they use digital technologies in small amounts in the classroom, generally to make children watch cartoons and listen to music. In addition, it is pointed out that teachers have difficulties in how to combine appropriate technology and educational activities in the classroom in order to use digital technologies effectively. Simsar and Kadim (2017), on the other hand, state that most of the teachers actively use information technologies mostly in music, Turkish and game activities, and they encounter some problems during this process. Another study points out that Turkish preschool teachers mostly use computers in musical activities and use computers approximately 1-2 times a week (Yurt and Cevher-Kalburan, 2011).

The majority of Preschool masters' students suggested combining technology with activities effectively, being creative and being a guide under the theme of teacher characteristics that develop children's 21st century skills. NAEYC (National Association for the Education of Young Children) (1996) suggested the integration of technology into learning as one of the factors that support children's cognitive and social skills. Rapid changes in technology created a need for the integration of technology with preschool education and literatüre suggests the importance of the employment of digital technologies into early childhood education (Erdoğan, 2015; Clements and Sarama, 2003; Haugland, 2000; Yelland, 2011; Marsh et al., 2005; Ghaith and Yaghi, 1997). It is pointed out that children's self confidence, taking responsibiliy of their own learning and problem solving skills improve when they actively participate in the activities through computers (McCarick and Xiaoming, 2007). While some negative effects of technology usage during preschool education are stated it is also thought to be more important that how and for how long technology is used (Goodwin, 2018; Haugland, 2000; Samur, 2020; Sayar and Benli, 2020). A need has arisen to use technology for preschool education since computers have become an indispensible part of life.

Having creative thinking skills during preschool period is a 21st century skill (P21, 2019a), and teachers who will develop these skills should also show creative features (Yenilmez and Yolcu, 2007). Preschool teachers are educators and guides who support the development of the child and arouse the child's interest and curiosity in learning (Dağlıoğlu, 2009). As in all activities, it is important for the preschool teacher to use these features actively for the technology-based activities. Computer education, which is provided through the guidance of the teacher and the use of creative features during the preschool period, offers children the opportunity to develop in many areas that interest them. It is very important to combine technology with activities creatively in teacher-guided processes. Education through the computer is effective in the development of self-expression and concept development, creativity, critical thinking, problem-solving skills, cooperation skills in reaching the goal, long-term memory and manual skills in terms of cognitive language development (Sayan, 2016). The correct use of computer technologies is seen as related to integrating activities with technology, using activities with and without technology in a balanced way, using them during group activities, and if possible, the program should be arranged for each child (Clements, 2002; Haugland, 2000).

While all of the preschool teaching master's students expressed an experience on the conscious technology control of the child in the theme of the responsibilities of the family in supporting childrens' acquisition 21st century skills during the preschool period, the majority of them expressed their opinion on teaching the child to use technology beneficially. Families can be informed about how to use technological tools such as computers they use at home. Conscious and appropriate use of technology is the duty of the family. However, it is important to cooperate with families in order for children to use technology appropriately, beneficially and in accordance with the rules in the home environment (Işıkoğlu-Erdoğan, 2015). Because researches show that there is a strong relationship between the screen viewing time for the media tools of the families with children in early childhood and the screen watching time of the children (Jago et al., 2012). Gündoğdu et al., (2016) aimed to inform parents about the harmful effects of media on children's health in their research on media in preschool children. He emphasized the importance of raising awareness among parents about the possible harmful effects of children's use of technological devices.

The majority of master's student participants voiced experiences regarding supporting the development of creativity of preschool children under the theme of responsibilities of the family in supporting childrens' acquisition 21st century skills during preschool period. Literature suggests freedom atmosphere in family in which children can voice their opinions and feelings openly, acceptance of children as individuals, enabling them take responsibility and providing them with psychological security are important for the development of children's creativity (Harrington et al., 1987).

The majority of the master's student participants stated that educational objectives in the curriculum are not adequate to develop children's 21st century skills under the theme of "21st century skills in preschool education program in Türkiye". They especially emphasized educational objectives and indicators regarding technology use skills are not adequate. In this context, it can be concluded that several investigations regarding preschool education program in Türkiye in different realms were conducted, and yet there is not adequate research regarding 21st century skills (Kardeş, 2020; Tuğluk and Özkan, 2019).

When the results of different studies on the subject are examined, it is seen that the results of this research are

compatible with them. Tuğluk and Özkan (2019) examined the inclusion of 21st century skills in the Turkish preschool education program, in which there were no goals and objectives exist regarding 21st century skills in the domains of psychomotor and self-care. In addition, the objectives regarding 21st century skills social-emotional, cognitive and language development domains were found to be 25.9% of the objectives of the entire curriculum. They determined that the indicators for 21st century skills correspond to 15.5% of the indicators in the program. Kardeş (2020), on the other hand, states that the Turkish preschool education program should be rearranged or revised in order to guide teachers in terms of 21st century skills and to provide children with the necessary 21st century skills. It is seen that the preschool education program mostly emphasizes entrepreneurship, responsibility, cultural awareness and research in terms of 21st century skills, and communication, creativity and problem-solving skills as competence skills. However, it is stated that the 2013 preschool education program is insufficient in terms of information, technology and media literacy, which are 21st century skills. Güngör (2021), in his research, states that when the 2013 Turkish preschool curriculum is examined in terms of 21st century skills determined in P21, there are gains related to critical thinking, problem solving, communication and media literacy, creativity, flexibility, adaptation, social and intercultural skills. It is stated that most of the gains related to 21st century skills are in the domain of social and emotional development, and it is explained that there is no acquisition related to motor development and self-care skills.

When we look at the practices abroad, it is seen that 21st century skills are included in the education programs of countries such as Australia, Canada, Finland, Belgium, Ireland, Italy, Norway and New Zealand (Anagün et al., 2016). In addition, strategies are being developed to integrate 21st century skills into preschool curriculum through policies in the United States. A framework was developed that supports teachers' understanding of how to design activities in formal and informal learning settings in order to develop children's 21st century skills (P21, 2109b).

Preschool teaching master's students' views on supporting children's acquisition of 21st century skills during preschool period are generally examined, and their views on family and teacher characteristics are compatible with the literature, and their views on the adequacy of 21st century skills in the Turkish National Ministry of Education Preschool Program are especially related to technology use skills. It is thought that the fact that they emphasized the inadequacy of the relevant acquisitions and indicators should be seen as an important opinion.

It can be concluded that the participants wanted the inclusion of technological skills into the curriculum and also wanted the betterment of technological conditions at schools.

The experiences of masters' students attending Preschool Education Program regarding the difficulties during the process of children's development of 21st century skills during preschool period

Difficult processes during children's acquisition of 21st century skills during preschool period

Master's students who are also preschool teachers expressed the technological conditions in their schools as difficulties experienced during children's acquision of 21st century skills during preschool period most intensely. Similar to these views, in a study in which Turkish preschool teachers participated, 32.1% of the teachers stated that there was a computer in the classroom that children could use, and 67.2% of them stated that there was not a computer in the classroom that children could use. 62.6% of the teachers stated that there is a computer that the teacher can use in the classroom and 36.6% of them stated that there is no computer that the teacher can use in the classroom. 56.5% of the teachers' state that they have Internet connection in the classroom, 42.7% of them state that there is no Internet connection in the classroom, and most of the teachers have received computer training. In addition, it was determined in the study that 42% of the teachers stated that they use technology outside of educational purposes (Orçan et al., 2017).

Similarly, it has been investigated whether the physical environment in preschool in Cyprus is suitable for the 21st century learning environment and whether it supports the needs of children and the development of twenty-first century skills. It has been determined that the physical environment is moderate in quality and has a traditional structure that does not conform to the recommendations of 21st century (Rentzou, 2021). Regarding the difficulties experienced in children's acquisition of 21st century skills during preschool period, the majority of preschool teaching master's students expressed that it is the level of teachers' readiness. Therefore, considering early childhood is a critical period for learning and development, preschool teachers should be supported to use computers effectively and to combine activities and technology both in undergraduate education and in-service training (Blackwell et al., 2013; Bayhan et al., 2002).

As a solution proposal for the difficulties in gaining 21st century skills during the preschool period, preschool teaching graduate students most intensely expressed the practical activity guide related to 21st century skills. In our country, a practical activity guide on 21st century skills has not been developed yet, but a framework guide that supports understanding how to practice 21st century skills in formal and informal learning environments in the preschool period in the United States is presented and adults are guided through specific examples based on practice related to 21st century skills in preschool period.

These guidelines have been formally prepared for preschool institutions and informally for use in settings such as home (P21, 2109b).

As a solution suggestion for the difficulties in children's acquisition of 21st century skills during preschool period, the majority of preschool teaching master's students stated that family education, teacher training, development of technological equipment in the classroom and adding 21st century skills to the preschool education curriculum. As a result of the literature review, it was determined that the views of the graduate students who are also preschool teachers were similar to the results of the studies on the subject (Blacwell et al., 2013; Bayhan et al., 2002; Gündoğdu et al., 2016; Orçan et al., 2017; Rentzou, 2021). The National Research Council (NRC) (2011) states that students are expected to develop 21st century skills such as problem solving, critical thinking, communication, cooperation and self-management. For this reason, it is important to prepare training programs that enable development of 21st century skills, and to provide teachers and teacher candidates with pre-service and in-service training regarding 21st century skills (Tuğluk and Özkan, 2019).

When the opinions of Turkish master's students attending Preschool Education Program about the difficult processes concerning children's acquisition of 21st century skills during preschool period and the solutions for these difficulties are examined, it is thought that it is important to evaluate the technological opportunities in the current educational environments. In addition, specifying the level of readiness of teachers as another difficulty suggests that teachers' undergraduate education and in-service training should be reviewed in this context. The fact that master's students attending Department of Preschool Education pointed out the importance of teacher education, family education, and suggested preparation of a practical activity guide concerning 21st century skills and addition of 21st century skills into the preschool curriculum as solutions is important for children's development of 21st century skills during preschool education. Although the participants knew how to apply some activities, methods and techniques it is also thought that the participants needed additional training concerning how to teach these skills. All of the teachers stated that they had problems with technological conditions at school. As a solution, it is seen that besides improving the technological infrastructure in schools, all teachers suggest preparing a practical activity guide. In this case, it is thought that teachers need guidance on how to combine technology and activities. It can be said that all teachers are aware of the importance of using and producing information digitally for activities, as digital literacy skills are stated by all teachers in the teacher characteristics that support the acquisition of 21st century skills. It is thought that these results will contribute in many ways to the creation of suitable educational environments to be offered for the development of 21st century skills.

Conclusion

In conclusion, it was found that masters' students studying Preschool Education have some knowledge concerning the development of 21st century skills of children during preschool period, and they design some activities based on their knowledge. However, they encounter some difficulties during the activity development phase. It was also found that they often emphasized their experiences regarding technological skills and difficulties they encounter. The findings of this research is expected to contribute the studies on curriculum development, planning and quality improvement regarding 21st century skills, and the needs of preschool children.

Suggestions

Based on the findings of this study, carried out to examine the views of master's students attending Preschool Education Program in Türkiye, regarding children's development of 21st century skills during preschool period; it is recommended to conduct experimental research regarding children's acquisition of 21st century skills during preschool period and conduct research observing preschool teachers' in classes while they are developing children's 21st century skills. In addition, studies concerning the evaluation of the development of 21st century skills of preschool children and scale development studies can be carried out. Also research investigating technological competencies of preschool teachers and investigating the facilities in educational environment can be conducted, Curriculum development studies aiming at children's development of 21st century skills during preschool period and research investigating parents' roles when children acquire 21st century skills during preschool period can be done.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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