Education Quarterly Reviews

Kanmaz, Ahmet. (2021), An Analysis of Elementary Teaching Undergraduate Program in Terms of 21st Century Skills. In: *Education Quarterly Reviews*, Vol.4, No.2, 526-538.

ISSN 2621-5799

DOI: 10.31014/aior.1993.04.02.298

The online version of this article can be found at:
https://www.asianinstituteofresearch.org/

Published by:
The Asian Institute of Research

The Asian Institute of Research *Education Quarterly Reviews* is a peer-reviewed International Journal. The journal covers scholarly articles in the fields of education, linguistics, literature, educational theory, research, and methodologies, curriculum, elementary and secondary education, higher education, foreign language education, teaching and learning, teacher education, education of special groups, and other fields of study related to education. As the journal is Open Access, it ensures high visibility and the increase of citations for all research articles published. The *Education Quarterly Reviews* aims to facilitate scholarly work on recent theoretical and practical aspects of education.

ASIAN INSTITUTE OF RESEARCH
Connecting Scholars Worldwide

The Asian Institute of Research
Education Quarterly Reviews
Vol.4, No.2, 2021: 526-538
ISSN 2621-5799

DOI: 10.31014/aior.1993.04.02.298

An Analysis of Elementary Teaching Undergraduate Program in Terms of 21st Century Skills

Ahmet Kanmaz[1]

[1] Pamukkale University, Denizli, Türkiye. Email: akanmaz45@gmail.com. ORCID NO: 0000-0001-8468-2042

Abstract
21st century skills emerge is one of the most crucial competencies that need to be considered in teacher education. With this in mind, the fundamental objectives of this study is to analyze the pre-service teachers' competencies and perceptions of 21st century skills that are effectively present in today's world. Explanatory mixed method was applied in this study. The aim of the study is to reveal the adequacy of the undergraduate elementary teaching program in the acquisition of 21st century skills from the perspective of pre-service teachers. In the study, quantitative data was collected through descriptive screening method, and qualitative data was collected through phenomenological analysis. 21st century skills scale was utilized to collect quantitative data, and semi-structured interview form was used to collect qualitative data. The sample of the study consists of 411 pre-service elementary teachers studying at a state university. According to the findings obtained, pre-service teachers perceived themselves quite sufficient in terms of "21st century skills". Given the qualitative findings, pre-service teachers reported that the learning-teaching processes were ineffective in the context of achieving 21st century competencies. As a matter of fact, 21st century skills are defined as skills that should be acquired within the scope of the elementary teaching undergraduate program. Failure to teach these skills emerges as the most significant limitation of the program. In particular, these skills and evaluations should be incorporated into the curricula content of faculties of education.

Keywords: 21st Century Skills, Elementary Teacher Education

1. Introduction

The times we live in have introduced enough developments to entail experience and knowledge of centuries. These developments have led changes in the definition of qualified person needed by institutions or other structures in society. This change has thus raised the question: "What kind of person should be raised?" In this context, it has brought discussion of how people can take part in the society they live in, of the ability to adapt to social developments and of what social skills they should have.

In the meantime, parallel to the teaching of 21st century skills and competences, educators have strived to develop a perspective towards 21st century skills. In today's world, when graduate people from all institutions, universities or relevant schools are asked if they are ready for their profession, they mostly reply as "I'm not ready." Studies show that people who have graduated from universities or relevant schools are insufficient,

especially in skills and attainments based on practice. Foremost among them are skills such as communication skills, critical thinking, problem solving, profession and professional ethics, teamwork and collaborative work, technology use, leadership and project management. The financial problems of the countries urge the institutions to recruit individuals with certain qualifications and skills without spending more on training and development (Trilling and Fadel, 2009). Especially the outbreak of the global COVID-19 coronavirus pandemic has created changes in many areas both in our country and the world. Given our country, a broad range of distance education practices, online trainings and seminars, teleconferences based on technological tools have been one of the most obvious indicators of this transformation. In today's world, the changing and developing global conditions have resulted in many changes and transformations in the dimensions of education and training. These changes and transformations can be educational, technological or intellectual. The changes in views towards the teaching profession, which is the fundamental component and stakeholder of educational processes, can also be considered among these changes and transformations. A set of skills are required to keep up with these changes and transformations, to give appropriate responses, to keep up with changing technologies, to obtain the information needed, to transform the obtained information into practice and turn this knowledge into a product. The so-called “Information Society” we live in entails skills named as “21st century skills” (Anagün, Atalay, Kılıç and Yaşar, 2016). 21st century skills are the common name of the skills consisting of three dimensions, including sub-skills : learning and innovation skills (knowledge and skill generation, learning to renew and learn), digital literacy skills (information literacy, media literacy, information and communication technologies literacy) and career and life skills (flexibility and adaptability, initiative and self-direction, intercultural interaction, leadership, productivity, and taking responsibility) (Trilling & Fadel, 2009). Creating the desired teacher profile plays a significant role in achieving desired educational outcomes. Teacher education has gained momentum in this regard. It is of vital importance that pre-service teachers, who serve as a guide of the future, have these values and characteristics (Özer and Gelen, 2008; Zhao, 2009; Orhan-Göksun, 2016).

Supporters and advocates of the 21st century skills movement asserts that educational reforms need to be realized to address social and financial needs of individuals in the 21st century (Larson and Miller, 2011). Emerging trends in the 21st century, the innovations related to information, information resources and the process of accessing information, globalization and accompanying multicultural structure have changed the needs and thoughts of people, and education systems have also been influenced by this change (Dağhan, Nuhoğlu Kibar, Menzi Çetin, Telli and Akkoyunlu, 2017). The main function of educational processes is to raise people who are qualified enough to meet social needs (Korkut and Akkoyunlu, 2008). Today, this function means raising qualified people who can cope with the 21st century’s challenges. Teachers, who play a crucial role in raising well-educated people, therefore bear major responsibilities.

Recent developments have brought about transformations in the field of education as well as in many other fields. These developments range from the technological infrastructure of schools to teacher competencies. Students and teachers, who are the most important stakeholders of the education system, are also the most important elements of this transformation. In order to guide the education process effectively, a teacher should get to know his / her student well and plan the teaching process to better suit the needs and characteristics of his / her student (Melvin, 2011). These changes highlight the need for 21st century teachers who can be able to communicate well with 21st century students, know their characteristics, and guide them in the teaching-learning processes. Institutions that will meet the needs of qualified individuals, in other words, that will train 21st century teachers are faculties of education. For this reason, faculties of education are responsible for equipping pre-service teachers, each of whom is 21st century students, with 21st century skills.

Recently, many reports have emphasized that pre-service teachers need to improve their 21st century skills (Aydın, 2019). The recent regulations made by the Turkish Council of Higher Education (YÖK) in 2018 sstipulate“21st century skills and competencies have been reviewed and taken into consideration” with respect to all undergraduate teaching programs (YÖK, 2018). “The General Competencies for Teaching Profession” published by Turkey’s Ministry of National Education’s (MEB) in 2017 highlight 21st Century skills such as cooperation, effective time management, professional development, personal development, considering individual differences, analytical thinking, active participation, using information and communication technologies effectively, following the national and global agenda, critical perspective, sensitivity to protection

of the natural environment and the historical and cultural heritage (MEB, 2017a). The "Teacher Strategy Document (2017-2023)" prepared by the Ministry of National Education, pointed out that teachers , along with their pedagogical competencies, need to integrate their 21st century skills such as effective communication, leadership, critical thinking, being open to change with their professional characteristics. (MEB, 2017b).

Considering all these aspects together, it is understood that the 21st century skills is one of the core competencies in teacher education. In this sense, one of the fundamental objectives of this study is to analyze the pre-service teachers' competencies and perceptions of 21st century skills that are effectively present in today's world. It is believed that such a study will play a vital role in pre-service teacher education and in-service training process in the future whereby the required areas to build 21st century skills can be identified. In other words, the present study may contribute to understand the effectiveness of the elementary teaching program for gaining 21st century skills needed today. Such studies can be used as a self-reflection or self-assessment tool for current and future teachers to learn 21st century skills and identify the dimensions they can use effectively. This research can also help faculty members incorporate 21st century skills into the pre-service teacher education. To this end, the following questions were sought to answer in the study:

1. To what extent do pre-service elementary teachers have 21st century skills?
2. Is there a significant difference among the mean scores of the pre-service teachers on 21st century skills in terms of the variables of gender, grade point average and grade level?
3. What are the major barriers to teaching 21st century skills during pre-service teachers' education?
4. How can university and faculty members help to build these skills?

2. Method

2.1. Methodology of the Study

In the study, a mixed explanatory method was used to identify the adequacy of elementary teaching undergraduate programme in the acquisition of 21st century skills from pre-service teachers' perspectives. In the mixed method, both the existing situation and the reasons for this situation are revealed. A mixed explanatory method involves two phase design where the qualitative data is collected first, then qualitative data is collected and analyzed based on the quantitative results (Creswell, 2008). The main reason for choosing a mixed method in this study is that the combination of quantitative and qualitative methods, instead of using a single method, will provide a better understanding of the research problem. The data collected in the study through the qualitative research method enabled to validate the quantitative results obtained in the first phase and carry out an in-depth investigation into the causes and solutions of the problems experienced by the pre-service teachers. In this study, 21st century skills scale for pre-service teachers and semi-structured interview form were used as data collection tools. During the research process, quantitative data were first collected and analyzed, and then qualitative data were collected and analyzed based on quantitative data. The analysis results of both data sets were compared and interpreted to see if the results were compatible with each other.

2.2. Quantitative Phase

As the quantitative dimension of the study aims to reveal an existing situation, screening model was used. Screening model is a form of research that aims to describe the present or past situation as it exists. (Büyüköztürk, Kılıç-Çakmak, Akgün, Karadeniz and Demirel; 2011, Karasar, 2010).

2.3. Research Sample

The population of the research consists of the pre-service teachers studying in the department of elementary teaching. The sample is composed of 411 pre-service elementary teachers, 231 of whom (56.2%) are female, 180 of whom (43.8%) are male, and who study at a state university. The cluster sampling method was used in the study. The sample was selected using cluster sampling method. Cluster sampling technique is the sampling technique in which all clusters in the universe have equal chance to be selected individually (together with all elements) (Karasar, 2010). In this respect, the main objective of the study is to reveal whether there is a

difference between the adequacy level of the program being implemented and the classes in terms of the acquisition of 21st century skills.

2.4. Quantitative Data Collection Tool

The '21st Century Skills Competence Perceptions Scale' was used in the study. This scale was developed by Anagün, Atalay, Kılıç, and Yaşar (2016), and consists of 3 sub-dimensions and 42 items. The first sub-dimension is the "Learning and Innovation Skills" sub-dimension consisting of 18 items. The second sub-dimension is the "Life and Career Skills" sub-dimension consisting of 16 items. The third sub-dimension of the scale is the "Information, Media and Technology Skills" sub-dimension consisting of 8 items. It was stated that the total variance explained by the three sub-dimensions regarding the whole scale was 51.30%. This result is sufficient to cover all items in the scale. Additionally, the reliability of the study was calculated with Cronbach Alpha. Reliability coefficient can be defined as the degree to which a measurement tool provides sensitive, consistent, and random error-free measurements (Fraenkel and Wallen, 1996). The reliability coefficient of the scale was calculated as .84. The reliability of the total scores obtained from the sub-dimensions of '21st Century Skills Competence Perceptions Scale' was calculated and tabulated in Table 1.

Table 1: Cronbach's Alpha Reliability Coefficients

Scale and Sub-dimensions	**Number of Items**	**Cronbach's Alpha**
Learning and Innovation Skills	18	.82
Life and Career Skills	16	.84
Information, Media and Technology Skills	8	.86
Total Scale	42	.84

For reliability of the scale, the Cronbach alpha coefficient must be .70 and above (Palant, 2017). In view of this information, the scale is reliable.

2.5. Data Collection and Analysis

The research data were obtained by the researcher in the digital environment in the 2019-2020 academic year. Elementary pre-service teachers were informed about the scale and the study. The scale is a 5-point Likert type consisting of 42 items. Participants in the study can receive a minimum of 42 points and a maximum of 210 points on the scale. The present study was also analyzed according to the sub-dimensions of 21st century skills. The 21st century skills consist of three sub-dimensions: Learning and Innovation Skills, Life and Career Skills, Information, Media and Technology Skills. The adequacy level of each sub-dimension was determined. The total scores of the participants were calculated. Further, the skewness and kurtosis coefficients and Kolmogorov-Smirnov test were analyzed to identify the normal distribution of the scores whereby it was thus intended to decide further analysis. Consequently, the following results were obtained.

Table 2. Results of Normality Tests Regarding the Distribution of Scores

Scale	$\overline{X}$	**Ss**	**Kurtosis**		**Skewness**		**K-S Test**
			Coefficient	**Standard Error**	**Coefficient**	**Standard Error**	
Learning and Innovation Skills	76.14	7.063	-687	.240	-303	.120	**p=0.449**
Life and Career Skills	66.96	7.092	-599	.240	-399	.120	**p=0.215**
Information, Media and Technology Skills	32.97	4.061	-119	.240	-645	.120	**p=0.117**
Total of 21st Skills	176.44	17.713	-643	.240	-380	.120	p=0.611

According to the data in Table 2, the assumptions of normality and homogeneity of variances were tested. The skewness and kurtosis coefficients were checked for the normality assumption. When considering the skewness and kurtosis coefficients, the skewness and kurtosis values of all the sub-dimensions and the total scores of the scale fall between -2 and +2. In this frame, the scores obtained by 411 students demonstrate a normal distribution in terms of both the total scale and sub-dimensions. For this reason, t-test and one-way analysis of variance (ANOVA), which are parametric statistical techniques, were conducted to seek answers to sub-problems of the scale. The data were analyzed using the SPSS 16.0 software. For data analysis, the significance level (p) was accepted as 0.05.

2.6. Qualitative Phase

The study seeks to identify pre-service teachers' perceptions regarding the extent to which elementary teaching undergraduate program empower them to achieve 21st century skills. Thus, it is a phenomenological study. Phenomenology is a form of research that focuses on cases of which we are aware but do not have an in-depth and detailed understanding. Phenomena can appear in various forms such as events experiences, perceptions, orientations, concepts and situations in the world we live in (Yıldırım and Şimşek, 2018). In this respect, phenomenology, one of the qualitative research designs, was used in the qualitative dimension of the study in order to determine the opinions of pre-service teachers about their experiences on this matter. Based on the faculty experiences of the pre-service teachers, the data source of the study, the pre-service elementary teachers' perceptions of 21st century skills were determined. In the qualitative dimension of the study, a semi-structured interview form developed by the researcher was employed. With respect to the preparation of the semi-structured interview form, the theoretical knowledge obtained by scanning the relevant literature and expert opinions served as a basis. The semi-structured interview form was reviewed by three faculty members who are specialized in the field of elementary teaching and was revised and finalized in line with the suggestions of the experts. The data obtained were collected by focus group interview technique through the Zoom program. Among the pre-service teachers who answered the scale, a total of 13 (6 Male, 7 Female) pre-service teachers participated in the semi-structured interview. Qualitative studies were carried out with 4th grade pre-service teachers. The 4th grade pre-service teachers were chosen because they have taken the courses in the entire programme. Interviews lasted 35-40 minutes and were recorded with a tape recorder. Afterwards, the data obtained by voice recording was written down, and content analysis was performed.

The interview questions used in the study are as follows:

1. How does the elementary teaching undergraduate program guide pre-service teachers to acquire 21st century skills?
2. Within the framework of these skills, which sub-dimensions do you feel the strongest and weakest? Why?
3. Within the framework of the current program, what are the major barriers to learning 21st Century skills?
4. What other skills would you like to develop besides from these skills?
5. How can university and faculty members help to build these skills?

2.7. Validity and Reliability of Qualitative Data

For the validity and reliability of the study, the qualitative data were reviewed by two researchers. As a result of the data obtained from interview forms, the data were grouped in themes. The themes were reexamined according to similarities, and consequentially similar or different themes were identified. The reconciliation rate between the researchers was calculated as 87%.

3. Findings and Interpretation

3.1. Findings Related to The First Sub-Problem

The first sub-problem of the study is to determine the level of 21st century skills of pre-service elementary teachers. In this frame, the data obtained are given in Table 3. The mean score of pre-service elementary teachers was calculated 76.09 for the sub-dimension of learning and innovation skills, 66.93 for the sub-dimension of

Life and Career Skills, 32.39 for the sub-dimension of Information, Media and Technology skills, and 176.34 for 21st century skills measuring the whole scale. When we divide the mean scores by the number of items, it is seen that the level is 4.22 for Learning and Innovation Skills, 4.18 for Life and Career Skills, 4.04 for Information, Media, and Technology Skills, and 4.04 for the total of 21st century skills, and it is quite high.

Table 3: Descriptive Statistics Concerning the Pre-Service Elementary Teachers' 21st Century Skills

	N	Minimum	Maximum	$\overline{X}$	Ss
Learning and Innovation Skills	411	22	88	76.09	6.984
Life and Career Skills	411	47	78	66.93	7.041
Information, Media and Technology Skills	411	58	37	32.39,	4.032
Total of 21st Skills	411	128	203	176.34	17.547

3.2. Findings Related to The Second Sub-Problem

The second sub-problem of the study seeks to identify whether there is a significant difference between the mean scores of pre-service elementary teachers on twenty-first-century skills according to the variables of gender, undergraduate GPA and grade level. The results of the t-test regarding the comparison of 21st Century Skills of pre-service elementary teachers by gender are presented in Table 4.

Table 4: Comparison of Pre-Service Elementary Teachers' 21st Century Skills by Gender

Dimensions	Gender	N	Mean	Ss	Sd	t	p
Learning and Innovation Skills	Female	231	4.24	0.39	409	.790	.430
	Male	181	4.21	0.38			
Life and Career Skills	Female	231	4.20	0.44	409	.997	.316
	Male	180	4.15	0.42			
Information, Media and Technology Skills	Female	231	4.13	0.53	409	.463	.638
	Male	180	4.10	0.47			
Total of 21st Skills	Female	231	4.21	0.43	409	.826	.406
	Male	180	4.17	0.40			

When Table 4 was examined, no significant difference was found between the mean scores of female pre-service teachers ($\bar{x}$ = 4.24; Ss = 0.39) and male pre-service teachers ($\bar{x}$=4.21; SS=0.38) in the sub-dimension of "learning and innovation skills" (t = 0.790; p> 0.05). No significant difference was also found between the mean scores of female pre-service teachers ($\bar{x}$ = 4.20; Sd = 0.44) and male pre-service teachers ($\bar{x}$=4.15; Ss=0.42) in the sub-dimension of "life and career skills" (t=.997; p>0.05). Additionally, no significant difference was found between the mean scores of female pre-service teachers ($\bar{x}$=4.13; Ss=0.53) and male pre-service teachers ($\bar{x}$=4.10; Ss=0.47) in the sub-dimension of "information, media and technology skills" (t = 0.463; p> 0, 05). When the total scores of the 21st century skills scale were examined, no significant difference was found between the mean scores of female pre-service teachers ($\bar{x}$ = 4.21; Ss = 0.43) and male pre-service teachers ($\bar{x}$=4.17; Ss=0.40) (t = 0.826; p> 0.05). Given these results, it can be stated that gender variable has no effect on 21st century skills.

The results of the variance analysis related to the comparison of 21st century skills of pre-service elementary teachers by the undergraduate GPA variable are tabulated in Table 5.

Table 5: Comparison of Pre-Service Elementary Teachers' 21st Century Skills by the undergraduate GPA variable

Dimensions	Group	N	Mean	Ss	Sd	F	p	Differentiation
Learning and Innovation	(Low)	101	4.21	0.42	2-408	4.107	**.017**	**y>o-d**
	(Medium)	218	4.19	0.38				

Skills	(High)	92	4.32	0.35				
Life and Career Skills	(Low)	101	4.14	0.46	2-408	3.105	**.046**	**y>o-d**
	(Medium)	218	4.15	0.43				
	(High)	92	4.28	0.42				
Information, Media and Technology Skills	(Low)	101	4.11	0.55	2-408	3.785	**.024**	**y>o-d**
	(Medium)	218	4.07	0.48				
	(High)	92	4.24	0.47				
Total of 21st Skills	(Low)	101	4.17	0.44	2-408	3.524	**.026**	**y>o-d**
	(Medium)	218	4.16	0.40				
	(High)	92	4.30	0.39				

When Table 5 is examined, the mean score of the pre-service teachers with low grade point average in the sub-dimension of "learning and innovation skills" was found to be ($\bar{x}$ = 4.21; Ss = 0.42) whereas the mean score of the pre-service teachers with medium grade point average was found to be ($\bar{x}$=4.19; Ss=0.38), and the mean score of those with high grade point average was found to be ($\bar{x}$=4.32; Ss=0.35). As a result of the variance analysis, a significant difference was found between the pre-service teachers with high undergraduate GPA and the pre-service teachers with medium and low grade point averages in favor of students with high grade point averages. (F = 4.107; p = .017 <0.05). In other words, it can be argued that that pre-service teachers with a high undergraduate grade point average see themselves more adequate in terms of innovation skills. Regarding the "Life and Career Skills" sub-dimension, on the other hand, the mean score of the pre-service teachers with low grade point averages was found ($\bar{x}$ = 4.14; Ss = 0.46); the mean score of the pre-service teachers with medium grade point averages was found ($\bar{x}$=4.15; Ss=0.43) and the mean score of the pre-service teachers with high grade point averages was found ($\bar{x}$=4.28; Ss=0.42). Likewise, following the variance analysis conducted, a significant difference was found between the pre-service teachers with high undergraduate GPA and the pre-service teachers with medium and low grade point averages in favor of students with high grade point averages (F = 3.105; p = .046 <0.05). We can thus imply that pre-service teachers who have a high undergraduate GPA perceived themselves more competent in life and career skills.

Given the sub-dimension of “Information, Media and Technology Skills,” the mean score of the pre-service teachers with low grade point averages was found ($\bar{x}$=4.11; Ss=0.55); the mean score of the pre-service teachers with medium grade point averages was found ($\bar{x}$=4.07; Ss=0.48) and the mean score of the pre-service teachers with high grade point averages was found ($\bar{x}$=4.24; Ss=0.47). As a result of the variance analysis, a significant difference was found between the pre-service teachers with high undergraduate GPA and the pre-service teachers with medium and low grade point averages in favor of students with high grade point averages (F=4.125; p=.024<0,05). This result denotes that pre-service teachers with high undergraduate grade point averages find themselves more adequate in terms of information, media and technology skills. When considering the pre-service teachers’ total score on twenty-first-century skills, the mean score of the pre-service teachers with low grade point averages was found ($\bar{x}$=4.17; Ss=0.44); the mean score of the pre-service teachers with medium grade point averages was found ($\bar{x}$=4.16; Ss=0.40) and the mean score of the pre-service teachers with high grade point averages was found ($\bar{x}$=4.30; Ss=0.39). In a similar vein, following the variance analysis , a significant difference was found between the pre-service teachers with high undergraduate GPA and the pre-service teachers with medium and low grade point averages in favor of students with high grade point averages (F=3.524; p=.026<0,05). This finding reveals that academic achievement plays a major role in acquiring 21st century skills.

According to Table 6, the mean score of the 1st grade pre-service teachers in the sub-dimension of “ Learning and Innovations skills” were found to be ($\bar{x}$=4.20; Ss=0.37); the mean score of the 2nd grade pre-service teachers were found to be ($\bar{x}$=4.17; Ss=0.35) ; the mean score of the 3rd grade pre-service teachers were found to be ($\bar{x}$=4.27; Ss=0.39) and the mean score of the 4th grade pre-service teachers were found to be ($\bar{x}$=4.24; Ss=0.42). As a result of the variance analysis, no significant difference was found in regard to the sub-dimension of “Learning and Innovation Skills” (F=1.451; p=.227>0, 05). When considering the sub-dimension

of " Life and Career Skills" the mean score of the 1st grade pre-service teachers were found to be ($\bar{x}$=4.12; Ss=0.43) ; the mean score of the 2nd grade pre-service teachers were found to be ($\bar{x}$=4.15; Ss=0.39); the mean score of the 3rd grade pre-service teachers were found to be ($\bar{x}$=4.21; Ss=0.48) and the mean score of the 4th grade pre-service teachers were found to be ($\bar{x}$=4.21; Ss=0.44). Following the variance analysis conducted, no significant difference was found in regard to the sub-dimension of "Life and Career Skills" (F=1.033; p=.378>0, 05). In the sub-dimension of " Information, Media and Technology Skills," the mean score of the 1st grade pre-service teachers were found to be ($\bar{x}$=4.04; Ss=0.55); the mean score of the 2nd grade pre-service teachers were found to be ($\bar{x}$=4.03; Ss=0.46), the mean score of the 3rd grade pre-service teachers were found to be ($\bar{x}$=4.24; Ss=0.48) and the mean score of the 4th grade pre-service teachers were found to be ($\bar{x}$=4.13; Ss=0.50). As a result of the variance analysis, a significant difference was found between the 3rd grade pre-service teachers and 1st and 2nd grade pre-service teachers in favor of the 3rd grade pre-service teachers (F=3.753; p=.011<0,05). In view of the results obtained, we can contend that the 3rd grade pre-service teachers perceive themselves more adequate in terms of "Information, Media and Technology Skills." According to the pre-service teachers' total score on twenty-first-century skills, the mean score of the 1st grade pre-service teachers was found to be ($\bar{x}$=4.14; Ss=0.41); the mean score of the 2nd grade pre-service teachers was found to be ($\bar{x}$=4.15; Ss=0.38); the mean score of the 3rd grade pre-service teachers were found to be ($\bar{x}$=4.25; Ss=0.44) and the mean score of the 4th grade pre-service teachers were found to be ($\bar{x}$=4.22; Ss=0.43). After the variance analysis, no meaningful difference was found related to the pre-service teachers' twenty-first-century skills (F=1.584; p=.193>0, 05).

Table 6: Comparison of Pre-Service Elementary Teachers' 21st Century Skills by Grade Level Variable

Dimensions	Groups	N	Mean	Ss	Sd	F	p	Difference
Learning and Innovation Skills	1st Grade	73	4.20	0.37	3-407	1.451	.227	
	2ndGrade	105	4.17	0.35				
	3rd Grade	106	4.27	0.39				
	4th Grade	127	4.24	0.42				
Life and Career Skills	1st Grade	73	4.12	0.43	3-407	1.033	.378	
	2ndGrade	105	4.15	0.39				
	3rd Grade	106	4.21	0.48				
	4th Grade	127	4.21	0.44				
Information, Media and Technology Skills	1st Grade	73	4.04	0.55	3-407	3.753	**.011**	**3>1-2**
	2ndGrade	105	4.03	0.46				
	3rd Grade	106	4.24	0.48				
	4th Grade	127	4.13	0.50				
Total of 21st Skills	1st Grade	73	4.14	0.41	3-407	1.584	.193	
	2ndGrade	105	4.15	0.38				
	3rd Grade	106	4.25	0.44				
	4th Grade	127	4.22	0.43				

3.3. Findings Related to the Third Sub-Problem

Pre-service teachers' views regarding the sub-dimension of "What are the major barriers to teaching 21st century skills during pre-service teachers' education?" were investigated, and consequently four themes were identified. The excerpt taken from the statements of the pre-service teachers and themes is given in Table 7.

Table 7: The Major Barriers to Teaching 21st century Skills in Pre-service Teachers' Education

Themes	Pre-service Teachers' Statements
The Physical Environment of Classrooms	The fact that the desks are fixed to the ground does not provide an effective teaching environment. I do not know why they switched to this order.
	The height of our teachers' chair creates a cooler atmosphere.
	Practices such as online attendance negatively affect our attendance at the

	beginning and middle of the course.
Insufficiency of Practical Courses	In teaching practice, mentor teachers leave the courses to internship students. That's why we can't learn anything from the teachers' experiences. Almost all of the elementary teachers working in the city center consist of teachers with multiple years of experience. Their experience may be an advantage, but not being aware of innovations also creates a disadvantage.
Insufficiency of Trainers	Some teacher educators think that student-centered education is about getting us to lecture the subject. Our lectures are generally instructed by faculty members, creative or critical thinking skills to emerge cannot be expected in this way anyway. There is still a teacher-centered education in our school. We are experiencing the difficulties of this process, that's why faculty members are very insufficient in terms of orientation. Even our instructors, who tell us to teach student-centered courses, teach teacher-centered courses. I do not think that the teacher educator adds anything to the students in terms of 21st century skills, as he/she only teaches the lectures on the subject in a straightforward manner within the scope of the curriculum.
KPSS Test Anxiety	21st century skills or something is not introduced as a question in KPSS. Honestly, that why I do not try very hard to acquire it. There is a test called KPSS that we have to pass in order to become a teacher, and anxiety about the future prevents us from improving. Everyone focuses only on the topics that will come out in the exam, even private tutoring courses. Whether we are teachers or not is determined only according to the KPSS test score, and it just measures knowledge. I'm not even counting the interview nonsense.

According to Table 7, the pre-service teachers reported the major barrier to acquiring 21st century skills was that although faculty members constantly stressed the importance of student-centered courses, they did not conduct their courses in this way. Allowing the students to give lecture within the framework of the student-centered education implies that the process has been misunderstood. Such practices can be noted as a mistake that occurs at all age levels. In addition to that, it is observed that the mentor teachers in teaching practice courses remain inadequate in guiding students to acquire 21st century skills. Because the teachers working in the city center are generally teachers with a multiple years of experience. For this reason, they can be unaware of innovations or resist such changes even if they are not inadequate. The fact that the classes in the Faculty of Education are physically inadequate to acquire 21st century skills emerge as a major obstacle to the acquisition of these skills. More specifically, however, we can highlight KPSS (Public Personnel Selection Examination) exam as the most important barrier at the 4th grade level. Because this exam mainly identifies knowledge-based goals. As a result, it causes students not to fully focus on their own improvement processes.

3.4. Findings Related to the Fourth Sub-Problem

As a result of the analysis of the pre-service teachers' views regarding the question of "How can university and faculty members help to build these skills?", four themes were identified. The pre-service teachers' statements and themes are detailed in Table 8.

Table 8: Recommendations to Improve 21st Century Skills in Teacher Education

Themes	**Pre-service Teachers' Statements**
The teacher educator should be a role model	In order to help students acquire 21st century skills, first of all, faculty members should use these skills. Faculty members should demonstrate techniques that really support these skills.

	A student-centered classroom environment should be created. Thus, an environment where students are more active can be provided.
Alternative assessment should be used.	Assessment should not be made in a single dimension. It makes things easier for us, but assessment should not be made only with multiple choice practices. Some of our teachers have even been asking the same questions for years. We don't even study for their exams. Different types of exams should be applied to make assessment process more consistent and valid.
Supervision should be done	When we examine 21st century skills, they are all very successful attainments in theory, but problems occur in practice. It should be tested whether the skills are acquired or not, which MEB is actually working on this matter. I think it will be useful if these practices are supervised. Many of our teachers have the knowledge of pedagogical formation, but being a teacher is not enough, they can change the methods and techniques they use. I guess they find it difficult, they talk about the same things all the time. I think our teachers have great responsibilities, there should be a control mechanism for the teachers. I mean if they do not improve themselves, there should be sanctions.
More practical courses should be available	Practical courses should not be limited to the fourth grade, but should be available every year. Practical skills related to the teaching profession are not the attainments that can be acquired in a single year, but we get to know their different dimensions as we experience them. We have the chance to see our shortcomings and to overcome these shortcomings. For teaching practice, there should be university-affiliated schools like Medical Faculties.

According to Table 8, it is seen that the most important action to be taken for the development of 21st century skills is the behavior of the faculty members from the pre-service teachers' perspectives. If faculty members use these skills in their own courses, they can be a very good role model for pre-service teachers. In addition to that, the use of alternative assessment methods and thus the ability to effectively measure 21st century skills will enable pre-service teachers to focus on these attainments. In order to acquire such professional skills, pre-service teachers should conduct activities promoting the acquisition of 21st century skills. This will only be possible with more practical courses. The inadequacy of the practical courses, which is the most important limitation of educational processes in Faculties of Education, is also seen as a major barrier to the acquisition of 21st century skills.

Discussion and Interpretation

The results obtained from the quantitative data indicate that the pre-service elementary teachers' general competency perceptions towards 21st century skills are high. In this context, the pre-service elementary teachers perceive themselves sufficient in developing their own thoughts and using alternative ways in solving the problems they encounter in daily life, in analyzing different thoughts and focusing on different dimensions, and in evaluating perspectives. Considering the relevant literature, the findings of previous studies also are consistent with the current study (Murat, 2018; Kozikoğlu and Altunova, 2018; Cemaloğlu, Arslangilay, Üstündağ and Bilasa, 2019). There are research results denoting that teachers working in secondary education outside of primary and secondary schools have a high level of 21st century skills (Gürültü, Aslan and Alcı, 2019). According to the existing literature, however, some studies revealed teachers' limitations with respect to the turning 21st century skills into practice and using these skills in classroom practices. (Bernhardt, 2015). Most of the criticisms related to the teaching of 21st century skills are that there is no systematic framework for applying these skills in courses. There are uncertainties about how teachers and students will be evaluated through these skills throughout the year (Bernhardt, 2015). On the other hand, it is difficult to predict students' progress

without the invaluable assessment of the 21st century skills. Further, the teaching programs in our country does not detail how to acquire the skills outlined in the program and there is no finding regarding whether these skills are acquired or not. Therefore, these skills are only defined in the program theoretically, and they are not achieved in practice. Further, as indicated in the qualitative data of the research, the KPSS exam is a major limitation for pre-service teachers to acquire professional skills, and guides them to theoretical knowledge rather than acquiring such skills.

According to the quantitative data of the study, the pre-service teachers consider themselves competent regarding information, media and technology at a certain level. When considering qualitative data, on the other hand, it is seen that these attainments do not emerge within the program. Because the curriculum does not involve a content which allows pre-service teachers to improve their skills in computer environment at the required level. In this respect, Basic Computer courses are only taught in the 1st grade. The pre-service teachers reported that it was just enough to prepare simple works and thus they easily passed the course. Therefore, they stated that the information provided in these lessons is very insufficient for today. They even uttered that students in lower age groups nowadays take courses such as coding, and even these courses surpass their technology knowledge. The finding of present study is also parallel to a study carried out by Clark (2008) who discussed teachers' competencies in acquisition of digital skills based on 21st century skills. The findings of the study reveal that most of the teachers benefit from technology-based tools such as Internet access and e-mail in their daily lives, which require a basic knowledge, however, they do not use these tools to acquire content such as 21st century skills that enable high-level attainments. The study also listed a lack of time, a lack of personal interest and lack of professional development as major barriers that preventing the teachers from integrating technology to develop high-level skills. In fact, as technology is used more intensely in today's societies, students' needs for digital technologies are at the forefront of education. The most important need in this process is the students' need to use technology to access, organize and evaluate the information acquired.

In this context, it is of utmost importance that 21st century skills should be integrated into education and training programs. The findings of the study conducted by Çakır and Güngör (2017) suggest that pre-service teachers have problems with respect to problem solving and using technology. In addition to that, the findings indicate that the current syllabi for the course are found to be ineffective in preparing pre-service teachers for 21st century teacher qualifications. Likewise, another study conducted by Göksun (2016) investigated the level of pre-service teachers 21st century learner skills use. According to research findings, preservice teachers often use cognitive acquisitions, along with theoretical knowledge, however, they use skills related to coping with problems they encounter in real life, such as collaboration and innovativeness skills above midlevel. Additionally, the findings of the present study also highlight the inadequacy of technology knowledge courses in Faculties of Education. Therefore, providing trainings in this regard will be effective in gaining 21st century skills. Unlike the findings of this study, in the study conducted by Çoklar (2008) with pre-service teachers from seven different universities in Turkey, it was found that PSTs' self-efficacy perceptions of educational technologies were high. Likewise, as a result of the study made by Dağhan, Nuhoğlu Kibar, Menzi Çetin, Telli and Akkoyunlu (2017), it was concluded that pre-service teachers are aware of 21st century learners' and teachers' characteristics.

Another significant findings of the study are that pre-service teachers' scores on twenty-first-century skills yielded significant difference in favor of only 3rd grade student in terms of grade level variable. The qualitative data of the study indicate that the education and training program is insufficient in terms of acquisition of 21st century skills. Qualitative data were obtained only from fourth grade students, and it was seen that they critically evaluated the teaching program. The qualitative data obtained showed that the strategies, methods and techniques utilized in elementary teaching programs were limited to traditional teacher-directed instruction, note taking and textbook. These findings imply that the instructors use traditional teaching strategies. This finding is consistent with the findings of research conducted by Ananiadou ve Claro (2009) on the learning and teaching process of primary schools in Turkey. This study was carried out in OECD countries and the basic skills acquired in the learning and teaching processes of the countries were identified. The results denote that although primary schools in our country emphasizes the importance of high-level thinking skills (creative , reflective, critical), communication skills, problem solving skills, and decision-making skills in the learning-

teaching processes, these skills are not implemented in the learning and teaching processes. The study also indicate that there are no assessment policies or teacher training programs specifically designed for these skills and competencies. Ananiadou and Claro (2009) discuss issues related to the teaching and assessment of 21st century skills and competencies in OECD countries drawing on the findings of a questionnaire study and other relevant background material such as white papers or curriculum documents. The findings show that there are few teacher training programmes that target the teaching or development of 21st century skills, although there exist several teacher training initiatives that focus on developing teachers" ICT pedagogical skills, most of them optional.

References

Aydın, A. (2019); *İngilizce Öğretmen Adaylarının Görüşleri Çerçevesinde Öğretmen Eğitiminde 21. Yüzyıl Becerilerinin İncelenmesi*, Yayımlanmamış Yüksek Lisans Tezi, Hacettepe Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.

Anagün, Şengül Saime, Nurhan Atalay, Zeynep Kılıç ve Serhat Yaşar (2016); Öğretmen Adaylarına Yönelik 21. Yüzyıl Becerileri Yeterlilik Algıları Ölçeğinin Geliştirilmesi: Geçerlik ve Güvenirlik Çalışması, *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi.* Sayı 40, s. 160-175.

Ananiadou, K., & Claro, M. (2009*). 21st Century Skills And Competences For New Millennium Learners In Oecd Countries*, OECD Education Working Papers, No. 41, OECD Publishing.

Bernhardt, E. P. (2015). 21st century learning: Professional development in practice. The Qualitative Report,20(1), 1-19.

Büyüköztürk, Ş., Kılıç Çakmak, E., Akgün, Ö. E., Karadeniz, Ş. Ve Demirel, F. (2011), *Bilimsel Araştırma Yöntemleri (10. Baskı)*. Ankara: Pegem Akademi.

Cemaloğlu, Necati, A. Selcen Arslangilay, Üstündağ, Tahsin Mutlu ve Pınar Bilasa (2019); Meslek Lisesi Öğretmenlerinin 21. Yüzyıl Becerileri Öz Yeterlik Algıları, *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi,Cilt 20, Sayı 2, s. 845-874*.

Clark, D. D. (2008). *A Study Of West Virginia Teachers: Using 21st Century Tools To Teach In A 21st Century Context*, Unpublished doctoral thesis. Marshall University, West Virginia.

Creswell, J. W. (2008). *Educational Research Planning, Conducting and Evaluating Quantitative and Qualitative Research*. International Pearson Merril Prentice Hall.

Çakır, A. & Güngör, M.N. (2017). Pre-Service Teachers' Evaluations of Practices in Teaching English to Young Learners in Terms Of 21st Century Teacher Qualifications. *Journal of Language and Linguistic Studies*, 13(1), 244-259.

Çoklar, A.N. (2008). *Öğretmen Adaylarinin Eğitim Teknolojisi Standartlari Ile Ilgili Özyeterliklerinin Belirlenmesi*, Yayınlanmamış doktora tezi. Anadolu Üniversitesi, Eğitim Bilimleri Enstitüsü, Eskişehir

Dağhan, G., Nuhoğlu Kibar, P., Menzi Çetin, N., Telli, E. ve Akkoyunlu, B. (2017), Bilişim Teknolojileri Öğretmen Adaylarinin Bakiş Açisindan 21. Yüzyıl Öğrenen ve Öğretmen Özellikleri, *Eğitim Teknolojisi Kuram ve Uygulama,* 7(2), 215- 235.

Fraenkel, J. K, &Wallen, N. E. (1996). How *to Design And Evaluate Research In Education (Third Edition).* New York: McGraw-Hill, Inc.

Göksun, O. D. (2016), *Öğretmen Adaylarinin 21. yy. Öğrenen Becerileri ve 21. Yy. Öğreten Becerileri Arasındaki Ilişki*. Yayınlanmamış doktora tezi. Anadolu Üniversitesi, Eğitim Bilimleri Enstitüsü, Eskişehir.

Gürültü, E., Aslan, M., & Alcı, B. (2019), Ortaöğretim Öğretmenlerinin 21. Yüzyıl Becerileri Kullanım Yeterlikleri, *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*. Advance online publication. DOI: 10.16986/HUJE.2019051590

Karasar, N. (2010), *Bilimsel Araştırma Yöntemi*, Ankara: Nobel Yayıncılık.

Korkut, E., ve Akkoyunlu, B. (2008), Yabancı Dil Öğretmen Adaylarının Bilgi ve Bilgisayar Okuryazarlık Öz-Yeterlikleri. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 34, 178-188*

Kozikoğlu, İshak ve Nebi Altunova (2018), Öğretmen Adaylarının 21. Yüzyıl Becerilerine İlişkin Öz-yeterlik Algılarının Yaşam Boyu Öğrenme Eğilimlerini Yordama Gücü, *Yükseköğretim ve Bilim Dergisi. Cilt 8, Sayı 3, s. 522-531.*

Larson, C. L. & Miller, N. T. (2011), 21st Century Skills: Prepare Students for the Future, *Kappa Delta Pi Record, 47(3), 121-123.*

Melvin, L. (2011), *How to Keep Good Teachers And Principals: Practical Solutions To Today's Elementary Problems*, R&L

Miles, M, B., & Huberman, A. M. (1994). *Qualitative Data Analysis: An Expanded Sourcebook. (2nd ed*). Thousand Oaks, CA: Sage.

Milli Eğitim Bakanlığı (2017a). *Öğretmenlik Mesleği Genel Yeterlikleri*. Öğretmen Yetiştirme ve Geliştirme Genel Müdürlüğü.

Milli Eğitim Bakanlığı (2017b*). Öğretmen strateji belgesi 2017-2023*, Öğretmen Yetiştirme ve Geliştirme Genel Müdürlüğü.

Murat, Ayşe (2018), *Fen Bilgisi Öğretmen Adaylarının 21. Yüzyıl Becerileri Yeterlik Algıları İle Stem'e Yönelik Tutumlarının İncelenmesi*, Yayımlanmamış Yüksek Lisans Tezi, Fırat Üniversitesi Eğitim Bilimleri Enstitüsü, Elazığ.

Orhan Göksün, D. (2016), *Öğretmen Adaylarının 21. Yüzyıl Öğreten Becerileri ve 21. Yüzyıl Öğrenen Becerileri Arasındaki İlişki*, Yayımlanmamış Doktora Tezi. Anadolu Üniversitesi Eğitim Bilimleri Enstitüsü, Eskişehir.

Trilling, Bernie and Charles Fadel, (2009); *21. St. Century Skills Learning For Life in Our Times*, Jossey-Bass A Wiley İmprint, San Francisco.

Yıldırım, A. ve Şimşek, H. (2006), *Sosyal Bilimlerde Nitel Araştırma Yöntemleri (5. baskı),* Ankara: Seçkin Yayıncılık

Zhao, Yong (2009), *Catching up or Leading The Way: American Education in the Age of Globalization*. ASCD, Virginia.