The Relationship Between 21st Century Learner Skills and Program Literacy Levels of Pre-Service Teachers

Ayşenur Kuloğlu[1]
[1]Fırat Unıversity, [ID] 0000-0003-0217-8497

The Relationship Between 21st Century Learner Skills and Program Literacy Levels of Pre-Service Teachers

Ayşenur Kuloğlu[1*]
[1]**Fırat University**

Abstract

The aims to examine the relationship between preservice teachers' 21st-century learner skills and their curriculum literacy levels. 476 preservice teachers studying at the Faculty of Education of a state university in Turkey participated in the study. The relational survey model was adopted in the study. The data were collected through "21stCentury Learners Skills Use Scale" and "The Curriculum Literacy Scale". Pearson Product Moments Correlation Coefficient and regression analysis were performed. The results showed that the participants' 21st century learner skills and curriculum literacy were at a high level and their 21st century learner skills and curriculum literacy levels did not differ significantly by gender. It was found that the participant's 21st century learner skills did not significantly differ by the department. However, it was discovered that the curricular literacy levels varied greatly by department. The participants in the preschool education department were found to have higher levels of curriculum literacy levels. In addition, a significant, moderate, and positive relationship was found between the participants' 21st century learner skills and curriculum literacy. Finally, 21st-century learner skills were statistically significant predictors of program literacy levels.

Keywords: 21st-century learner skills, Curriculum literacy, Preservice teachers

Introduction

Today, the new generations of students, many of whom are university-educated, are trying to live in a world that develops rapidly and in a flawed way, and they need to be prepared to develop the skills of the new century to adapt to such a developing world (Purpose, 2021). The importance of 21st century skills, which contribute to the development of individuals living in society in accordance with the conditions of their age and their desire to constantly improve themselves, has increased with the ever accelerating and emerging technology. With this rapid change and development, individuals' skills and abilities in any sector also change rapidly (Göksün, 2016). With this change, in addition to the transmission of information, life skills are developing, which are necessary to inform students during the educational process, to teach them moral values correctly and effectively, and to facilitate the adaptation of individuals to society.

The 21st-century skills, which students and individuals need to have to adapt to the 21st century, are defined by Ministry of National Education of Turkey (MEB), P21 and OECD (Cansoy, 2018). From past to the present, it has been thought that reading, writing, and mathematics formed the basis of learning in the education process. However, according to the US Education Minister Arne Duncan (2009), with the 21st-century skills, which have been introduced with the changing technology, problem-solving, productivity, creativity, and perseverance should also be included in the education of learners (Larson & Miller, 2011). Trilling and Fadel (2009) define 21st century skills as the skills individuals need to succeed. While it is necessary for a learner or teacher to develop cognitive skills such as mathematics and literacy to be successful in the twenty-first century, it is also necessary to think logically, produce practical solutions to any problem, and master non-cognitive skills such as responsibility and leadership (Kivunja, 2014; Pellegrino & Hilton, 2012). Learners who adapt to 21st-century skills will be able to communicate effectively at the end of this process. By participating in group work, they can both take a leadership role and develop a sense of responsibility. The competencies that learners should possess in the 21st century can be briefly summarized as follows (Yalçın, 2018):

- Innovation skills
- Digital literacy

---

* Corresponding Author: *Ayşenur Kuloğlu, adonder@firat.edu.tr*

- Productivity
- Media and information communication technologies

Life and career skills, which are 21st-century abilities that include information and communication technologies utilized for self-learning by both teachers and learners, help in the development of skills such as leadership, ethical behaviors, personal accountability, and social responsibility. (Kaufman, 2013). For learners to master 21st-century skills, teachers are also required to conduct effective teaching. Individuals willing to teach 21st-century skills, in other words, teachers, should have the flexibility to teach these skills (Clark, 2009). Learners interact the most with teachers after friends and family. To teach 21st century skills, the teacher and the learner should be communicated well and effectively, and the teachers should guide the learners (Palfrey & Gasser, 2008; Göksün & Kurt, 2017). Furthermore, it is very important for teachers to define and be aware of learners' personal characteristics and development, what they know and do not know, and their interests in this process (Callison & Lamb, 2004). Additionally, the following three elements need to progress and be applied harmoniously for 21st-century skills to be effective:

- To meet and renew the needs of the regions where the schools are located and schools
- A new assessment to make rich learning effective and measure it correctly.
- Educators must ensure that educational programs are completed (Roterham & Willingham, 2009).

It is of crucial importance and required for learners and teachers to integrate with the curriculum to be prepared and adapt to the skills of the 21st century, the first decade of which has ended. Therefore, to teach 21st century skills effectively and efficiently, educational programs have been developed to prepare learners for the 21st century (Toptal, 2021; Larson & Miller, 2011). Educational programs are officially approved documents used to transfer values and achievements that are considered important and valuable by the society to children in an effective and accurate way. The educational programs ensure that the education process of a country is planned and programmed. Therefore, educational programs elucidate and guide the education and future of a country. In sum, the educational program can be regarded as the map of the education process (Bolat, 2017; Erdem & Eğmir, 2018).

The curriculum is divided into target, content, learning and teaching, and assessment and evaluation. Curriculum literacy needs all four elements of the curriculum to develop. If these four elements are adapted, the proficiency of curriculum literacy will also be improved (Çetinkaya & Tabak, 2019). Curriculum literacy or program literacy was also mentioned in the content knowledge proficiency section of the teaching profession issued by MEB in 2017. If the instructors have higher levels of curriculum literacy proficiency, the students or preservice teachers will be more likely to develop curriculum literacy proficiency (Akyıldız, 2020). In addition, curriculum literacy, one of the features teachers and preservice teachers should possess, appears to contribute to the individual's development and the shaping of the expected behaviors (Karagülle et al., 2019). This study investigated 21st-century skills and program literacy levels of preservice teachers. The 21st-century skills and program literacy levels of preservice teachers and their effects on each other were determined. Thus, this study will contribute to the literature by revealing the relationship between 21st-century skills and program literacy levels.

Method

The relational survey model, one of the quantitative research methods, was used in this study to examine the relationship between 21st-century learning skills and curriculum literacy levels of preservice teachers. In the relational survey model, data are collected, and the relationship between the collected data is investigated (Can, 2018). In line with the research model, there were two variables in this study: 21st-century skills as the independent variable and curriculum literacy as the dependent variable.

Participants

The universe of this study consisted of preservice teachers studying in the 3rd and 4th grades at the Faculty of Education of a Turkish state university in the 2020-2021 academic year. Convenience sampling was used to select the sample, a type of sampling that includes the most time and economically appropriate individuals in accordance with the purpose of the study. (Balcı, 2020). All the students were tried to be reached, and the participation was voluntarily. As a result, 476 students participated in the study. The demographic information of the participants is presented in Table 1.

Table 1. Demographic information of the participants

Variable		Frequency (n)	Percentage (%)
Gender	Female	367	77,1
	Male	109	22,9
	Total	476	100
Department	Preschool Education	127	26,7
	Elementary Mathematics Education	28	5,9
	Social Sciences Education	107	22,5
	Classroom Instruction Education	31	6,5
	English Language Education	29	6,1
	Elementary Science Education.	40	8,4
	Psychological Counselling and Guidance Education	114	23,9
	Total	476	100

Of the participants, 367 (77,1%) were female, and 109 (22,9) were male. The departments of the participants were as follows: 127 (26,7) pre-school education, 28 (5,9%) elementary mathematics education, 107 (22,5%) social sciences education, 31 (6,5%) classroom instruction education, 29 (6,1%) English language education, 40 (8,4%) elementary science education, and 114 (23,9%) psychological counseling and guidance education.

Data Collection Tools

21st Century Learners Skills Use Scale

21st Century Learners Skills Use Scale was developed by Orhan-Göksün (2016) and consisted of 31 items scored on a five-point Likert type scale. The scale has 4 sub-scales: cognitive skills, autonomous skills, collaboration and flexibility skills, and innovativeness skills. There is no reverse-coded item on the scale. The Cronbach's Alpha value was found to be 0.877, 0.706, 0.672, and 0.818 for the sub-scales, respectively, and 0.892 for the total scale (Orhan Göksün, 2016). This study calculated it as 0.894, 0.715, 0.721 and 0.897 for the sub-scales, respectively, and 0.864 for the total scale. These values indicated that the study was reliable. The distribution of scale items to dimensions is as follows: Cognitive Skills (Items 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 21, 22, 23, 25, 28, 29), Autonomous Skills (Items 3, 17, 18, 26, 30, 31), Collaboration and Flexibility Skills (Items 13, 14, 15, 16, 24, 27), Innovativeness Skills (Items 19, 20)

Curriculum Literacy Scale

The Curriculum Literacy Scale, developed by Bolat (2017), consisted of 31 items scored on a five-point Likert type scale and two sub-scales, namely reading and writing. There is no reverse-coded item on the scale. The Cronbach's Alpha value was found to be 0.888 for the reading, 0.907 for the writing, and 0.94 for the total scale (Bolat,2017). This study calculated it as 0.93 and 0.94 for the sub-scales and 0.96 for the total scale. These values showed that the study was reliable.

Data Analysis

In the study, 'the means and standard deviations of the scales were calculated to examine the participants' 21st century learner skills and curriculum literacy levels. The values were interpreted as follows: "1-1.79" very low, "1.80-2.59" low, "2.60-3.39" moderate, "3.40-4.19" high and "4.20-5.00" values as very high. Before data analysis, the data were tested for normality. Skewness and kurtosis values of the data are shown in Table 2.

Table 2. The skewness and kurtosis values

Variables	$\bar{X}$	sd	Skewness Value	Skewness Std. Er.	Kurtosis Value	Kurtosis Std. Er.
21st Century Learner Skills Use	4,09	.540	-.013	.112	.699	.223
Cognitive	4,28	.532	-.065	.112	.254	.223
Autonomous	3,57	.701	-.136	.112	.299	.223
Collaboration and flexibility	3,42	.829	-.182	.112	-.111	.223
Innovativeness	3,87	.841	-.426	.112	-.482	.223
Curriculum Literacy	3,81	.569	.005	.112	-.356	.223
Reading	3,91	.650	.008	.112	-.222	.223
Writing	3,71	.558	-.169	.112	-.198	.223

As shown in Table 2, the values for skewness ranged from -.426 to .008, and the values for kurtosis ranged from -.482 to .699. The fact that the skewness and kurtosis values are between -1 and +1 indicates that the data is normally distributed (Büyüköztürk, 2016). Accordingly, the data in the present study were normally distributed. Since the data showed a normal distribution, in this study, Independent Samples t-Test was performed for the gender and ANOVA for the department. In addition, to determine the source of the difference, Scheffe's test was used as a post-hoc. Furthermore, correlation analysis was used to examine the relationship between 21st-century learner skills and curriculum literacy levels. Pearson correlation coefficients are considered as '0.00-0.29' as low correlation, 'between 0.30-0.69' as moderate correlation, and between '0.70-1.00' as high correlation (Büyüköztürk, 2016). Finally, regression analysis was run to investigate the predictability of 21st-century learner skills on curriculum literacy, which was determined as the outcome variable.

Findings

The descriptive statistics of the 21st-century learner skills and curriculum literacy levels of the participants are presented in Table 3.

Table 3. 21st century learner skills and curriculum literacy levels of the participants

	N	$\bar{X}$	sd	Level
21st Century Learner Skills Use	476	4,09	.540	High
Cognitive	476	4,28	.532	Very High
Autonomous	476	3,57	.701	High
Collaboration and flexibility	476	3,42	.829	Moderate
Innovativeness	476	3,87	.841	High
Curriculum Literacy	476	3.81	.569	High
Reading	476	3.91	.558	High
Writing	476	3.71	.650	High

Table 3 shows that the participants' 21st century learner skills ($\bar{X}$=4,09) and Curriculum literacy ($\bar{X}$=3,81) were high. It was also found for the sub-scales of 21st Century Learner Skills Use Scale that the level was very high in Cognitive Skills ($\bar{X}$=4,28), and high in Autonomous skills ($\bar{X}$=3,57), Collaboration and Flexibility Skills ($\bar{X}$=3,42), and Innovativeness Skills ($\bar{X}$=3,87). The Reading ($\bar{X}$=3,91) and Writing ($\bar{X}$=3,71) sub-scales of the Curriculum Literacy Scale were found to be high.

Table 4 shows the results of the independent samples t-test conducted to determine whether the participants' 21st-century learner skills and curriculum literacy levels differ concerning gender.

Table 4. Independent samples t-test results

	Gender	N	X	S	t	p
A. 21st Century Learner Skills Use	Female	367	4,09	.55	.327	.744
	Male	109	4,27	.50		
A1. Cognitive	Female	367	4,28	.53	.172	.863
	Male	109	4,27	.52		
A2. Autonomous	Female	367	3,52	.70	-2.548	.011
	Male	109	3,72	.67		
A3. Collaboration and flexibility	Female	367	3,42	.83	.009	.993
	Male	109	3,42	.84		
A4. Innovativeness	Female	367	3,85	.86	-.978	329
	Male	109	3,94	.79		
B. Curriculum Literacy	Female	367	3,81	.68	-.379	.705
	Male	106	3,83	.65		
B1. Reading	Female	367	3,91	.56	.097	.922
	Male	109	3,90	.59		
B2. Writing	Female	367	3,70	.64	-.777	.437
	Male	109	3,75	.69		

*p<.05

No significant difference was found in the 21st Century Learner Skills Use Scale and its sub-scales concerning gender. However, in the autonomous skills sub-scale (t=- 2,548, p<.05), a significant difference was revealed in favor of male participants. Finally, a significant difference was not found in the Curriculum Literacy Scale and its sub-scales concerning gender.

Table 5 shows the results of ANOVA, which was performed to investigate whether the 21st-century learner skills and curriculum literacy levels of preservice teachers differ concerning the department they study.

Table 5. The comparison of the participants with regard to department

Scale	Department	N	$\overline{X}$	S	F	p	Difference
A. 21ˢᵗ Century Learners Skills Use	a.Pre-school Edu.	127	4,10	,58	1,437	,199	
	b.Elementay Math Edu.	28	3,96	,43			
	c.Social Sciences	107	4,19	,56			
	d.Classroom Edu.	31	4,13	,67			
	e.English Lang. Edu.	29	4,07	,53			
	f.Elementary Science Edu.	40	4,03	,28			
	g. Psy. Coun. and Guidance	114	4,02	,53			
B. Curriculum Literacy	a.Pre-school Edu.	127	3,94	,69	4,076	,001	a>g g<c
	b.Elementay Math Edu.	28	3,89	,65			
	c.Social Sciences	107	4,02	,64			
	d.Classroom Edu.	31	3,97	,71			
	e.English Lang. Edu.	29	3,76	,69			
	f.Elementary Science Edu.	40	3,75	,59			
	g. Psy. Coun. and Guidance	114	3,63	,60			

*p<.05

As shown in Table 5, the pre-service teachers' 21st Century Learner Skills Use scores did not differ significantly by the department. However, there was a significant difference (F=4,076; p=0.001<0.05) between the Curriculum Literacy Scale and the department of the participants. To reveal the source of the difference, the Scheffe test was used. It was found that the curriculum literacy levels of the preservice preschool teachers were higher than the preservice social sciences studies teachers, who were at a higher level than the preservice Psychological Counselling and Guidance teachers. Table 6 presents the findings of Pearson's Product-Moment Correlation Analysis which was used to determine the relationship between preservice teachers' 21st-century learner skills and their curriculum literacy levels.

Table 6. The relationship between 21ˢᵗ-century learners' skills use and curriculum literacy

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1.21ˢᵗ Century Learners Skills Use	1							
2.Cognitive Skills	,718**	1						
3.Autonomous Skills	,521**	,320**	1					
4.Collaboration and Flexibility Skills	,425**	,330**	,241**	1				
5.Innovativeness Skills	,518**	,428**	,288**	,386**	1			
6. Curriculum Literacy	,517**	,505 **	,394**	,439**	,419**	1		
7. Reading	505**	508**	,392**	,387**	,372**	,940**	1	
8. Writing	,473**	,450**	,353**	,441**	,417**	,949**	,785**	1

**p<.01, N=476

The results revealed a moderate relationship between preservice teachers' 21st century learner skills and curriculum literacy levels (r= .517; p<.01). In addition, there was a positive and moderate relationship between Cognitive Skills and Curriculum Literacy (r= .505; p<.01). Also, a positive and moderate relationship was found between Autonomous Skills and Curriculum Literacy (r= .394; p<.01). Furthermore, there was a positive and moderate relationship between Collaboration and Flexibility Skills and Curriculum Literacy (r= .439; p<.01) and between Innovativeness Skills and Curriculum Literacy (r= .419; p<.01). These findings indicated that as the participants' 21st century learner skills increased; their curriculum literacy levels increased as well. Finally, a positive relationship was found between curriculum literacy levels and its subscales and 21st-century learning skills and sub-scales.

Table 7. Regression analysis of participants' 21st-century learners' skills use and curriculum literacy levels

Dependent Variable	Independent Variable	B	Standard Error	Beta	t	p	F	R2
Curriculum Literacy	Constants	1,369		,490			149,721	0.240
	21st Century Learner's Skills Use	,608	,050		12,236	0,000*		

*p<.01

Table 7 revealed that 21st-century learning skills significantly predicted curriculum literacy level perceptions (R=.490, R2=.240, F=149.721 p=0.000 p<.01). The beta coefficient of the independent variable, the t value, and significance level showed that 21st century learning skills had a statistically significant effect on curriculum literacy perceptions (t=12.236 p<0.05). A 1-unit increase in the 21st-century skills led to a .490 increase in curriculum literacy perceptions (β=1,369). It was found that 24% of the change in curriculum literacy perceptions was explained.

Discussion and Recommendations

The faculties of education in which preservice teachers are trained should provide 21st-century skills and competencies (Orhan Göksun, 2016). Yıldız (2019) proposed that, as in all fields, the comprehensive, rapid and in-depth information exchange and development in the 21st century brought curriculum literacy to the agenda in the field of education. Curriculum literacy is significant in that it shows how much of the objectives in the curriculum are achieved. Curriculum literacy skills play an important role in the formation of preservice teachers' teaching skills. Briefly, preservice teachers need to have knowledge on curriculum literacy (Snavely 1997; Kapitzke 2001). Teachers who are program literate and develop in this direction will also contribute to their professional life. This study aimed to examine preservice teachers' 21st century learner skills and curriculum literacy level and the relationship between them.

In this study, in which the relationship between preservice teachers' 21st century learner skills and curriculum literacy levels was examined, it was found that their 21st century learner skills were at a high level. This finding is in line with other studies in the literature. For example, Bozkurt (2020), Claro (2009), Engin and Korıcuk (2021), Gülen (2013), Karakaş (2015), Gürültü, Aslan and Alcı (2019), Kıyasoğlu and Çeviker (2020) reported high levels of 21st-century learner skill. However, Aydemir (2020) and Eğmir and Erdem (2021) found that the 21st-century learner skills of preservice teachers were at a moderate level. Some activities can be conducted to increase the 21st-century skills of preservice teachers. For example, Peker (2019) concluded that reading books positively affected preservice teachers' use of 21st-century learner skills. This finding is consistent with studies in the literature (Bozkurt & Çakar, 2016; Canpolat,2021; Eğmir &Erdem,2021; Gürültü, Aslan &Alcı, 2019; Karakaş,2015; Kıyasoğlu & Çeviker Ay 2020; Kozikoğlu & Altunova, 2018; Orhan-Göksün & Kurt, 2017; Önür & Kozikoğlu, 2019; Peker,2019). However, Engin and Korucuk (2021) found a significant difference in favor of male participants. This was because males found more opportunities to develop their responsibility and leadership than females.

It was found in the study that there was no significant difference in terms of the department. Eğmir and Erdem (2021) reported that preservice pre-school teachers had significantly higher skills. Akbay, Sıvacı, and Akbay (2020), on the other hand, found that preservice social studies teachers had higher levels of 21st century skills.

It was also found that preservice teachers' curriculum literacy levels were at a high level. Similarly, studies conducted with prospective teachers (Dilek, 2020; Çetinkaya & Tabak,2019; Şahin,2020) and teachers (Aygün,2019; Erdem & Eğmir, 2018; Gündoğan, 2019; Güneş Şinegove Çakmak, 2021, Süral & Dedebali, 2018; Aslan & Gürlen, 2019; Kuyubaşıoğlu, 2019; Keskin, 2020; Gülpek, 2020, Yılmaz & Kahramanoğlu, 2021) showed that they had high levels of curriculum literacy levels. However, some studies (Kahramanoğlu, 2019; Yıldız, 2019) reported a moderated level of curriculum literacy. In contrast, Gani and Mahjaty (2014) and Opoh and Awhen (2015) stated that teachers' curriculum literacy levels were low. The fact that preservice and in-service teachers have high curriculum literacy is positive for education. Thus, focusing on teaching practices in the education of preservice teachers and directing them to applied courses would develop their curriculum literacy (Carl, 2005).

It was found that the participants' curriculum literacy levels did not significantly differ by gender. In line with this finding, studies in the literature reported that preservice and in-service teachers do not differ by gender (Dilek, 2019; Demir & Toraman, 2021; Gülpek, 2020; Erdem & Eğmir,2018; Keskin, 2020; Tunçer & Şahin,2019). According to Dilek (2020), one of the main reasons why the curriculum literacy of preservice and

in-service teachers does not differ by gender is that they follow current education programs and have adopted the innovations in their fields. Contrary to the findings of the present study, Erdamar (2020) and Ustabulut (2021) found that in-service teachers' curriculum literacy perceptions were higher in male teachers whereas Aygün (2019) and Kahramanoğlu (2019) found that female participants had higher curriculum literacy levels.

The findings revealed that the curriculum literacy of the participants significantly differed by the department. It was found that preservice pre-school teachers and preservice social sciences teachers had higher curriculum literacy levels. The study of Süral and Dedebali (2018) supports this finding. On the other hand, Erdem and Eğmir (2018) found that the preservice teachers at the Turkish Language education department had higher curriculum literacy levels than those at the Mathematics education department. Çetinkaya and Tabak (2019) also demonstrated that curriculum literacy levels of preservice teachers at Classroom Teaching department were higher than those in Pre-school and Mathematics Education departments.
A positive and moderate relationship was found between preservice teachers' 21st century learner skills and curriculum literacy. In addition, there was a moderate relationship between curriculum literacy and Cognitive and Collaboration and Flexibility and Innovativeness sub-scales, and a weak relationship between curriculum literacy and Autonomous sub-scale.

It was found in this study that the participants' 21st century learner skills were a significant predictor of their curriculum literacy levels. Participants' 21st century learner skills explained 24% of curriculum literacy changes. As the participants' 21st century learner skill levels increased, their curriculum literacy levels also increased. It can be said that, through these skills, preservice teachers can better understand the curriculum when they become a teacher in the future. Thus, it can be anticipated that a preservice teacher and in-service teacher who understands the curriculum better and has 21st Learner skills may have a more positive attitude towards the profession. The development of 21st-century learner skills of preservice teachers will pave the way for them to become better curriculum literate, which will also contribute to their professional life. Thus, it can be put forward that they will be more productive while performing in the teaching profession. Therefore, efforts should be made to develop these skills in prospective teachers in undergraduate courses.

Ethical Approval (only for necessary papers)

References

Akbay, T., Sıvacı, S.Y., & Akbay, L. (2020). Investigation of teacher candidates' 21st century learner skills via PAMS. *Elementary Education Online, 19*(3), 1498-1508.

Akyıldız, S. (2020). Öğretim programı okuryazarlığı kavramının kavramsal yönden analizi: Bir ölçek geliştirme çalışması. *Elektronik Sosyal Bilimler Dergisi, 19*(73), 315-332.

Ananiadou, K., & Claro, M. (2009). 21st century skills and competences for new millennium learners in OECD countries. *OECD Education Working Papers,* Paris: OECD Publishing.

Aslan, S., & Gürlen, E. (2019). Ortaokul öğretmenlerinin program okuryazarlık düzeyleri. *Ahi Evran Universitesi Kırşehir Eğitim Fakültesi Dergisi*, *20*(1), 171-186.

Aydemir, H., Karalı, Y., & Coşanay, G. (2020). Sosyal bilgiler öğretmen adaylarının 21. yüzyıl öğreten ve öğrenen becerilerinin incelenmesi. *Uluslararası Sosyal Bilimler Akademi Dergisi*, (4), 1199-1214. https://doi.org/10.47994/usbad.824081

Aygün, H. E. (2019). Öğretmen adaylarının öğretmenlik mesleği hazırbulunuşluk düzeyinin eğitim programı okuryazarlığı açısından yordanması. *Uluslararası Eğitim Programları ve Öğretim Çalışmaları Dergisi*, *9*(2), 203-220.

Balcı, A. (2020). *Sosyal bilimlerde araştırma: Yöntem, teknik ve ilkeler* (14.Baskı). Ankara: Pegem Yayınları.

Başar, S. (2018). *Fen bilimleri öğretmen adaylarının fende matematiğin kullanımına yönelik özyeterlik inançları, 21. yy. becerileri ve aralarındaki ilişkinin incelenmesi* [Yayınlanmamış yüksek lisans tezi]. Hacettepe Üniversitesi, Ankara.

Bolat, Y. (2017). Eğitim programı okuryazarlığı kavramı ve eğitim programı okuryazarlığı ölçeği. *Turkish Studies: International Periodical for the Languages, Literature and History of Turkish or Turkic, 12*(18), 121-138. http://dx.doi.org/10.7827/TurkishStudies.12103

Bozkurt, F. (2021). 21. yüzyıl becerileri açısından sosyal bilgiler öğretmenliği lisans programının değerlendirilmesi. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, (51), 34-64. https://doi.org/10.9779/pauefd.688622

Büyüköztürk, Ş. (2016). *Sosyal bilimler için veri analizi el kitabı*. Pegem.

Callison, D., & Lamb, A. (2004). Audience analysis. *School Library Media Activities Monthly, 21*(1), 34-39.

Can, A. (2018). *SPSS ile bilimsel araştırma sürecinde nicel veri analizi*. Pegem.

Canpolat, M. (2021). Öğretmen adaylarının 21. yüzyıl becerileri ile duygusal zekâ düzeyleri arasındaki ilişki. *Yükseköğretim ve Bilim Dergisi, 11*(3), 527-535.

Cansoy, R. (2018). Uluslararası çerçevelere göre 21.yüzyıl becerileri ve eğitim sisteminde kazandırılması. *İnsan ve Toplum Bilimleri Araştırmaları Dergisi, 7*(4), 3112-3134.

Clark, T. (2009). 21st century scholars. *Educational Leadership, 67*(1), 66-70.

Çetinkaya, S., & Tabak, S. (2019). Öğretmen adaylarının eğitim programı okuryazarlık yeterlilikleri. *Ondokuz Mayıs Üniversitesi Eğitim Fakültesi Dergisi, 38*(1), 296-309.

Dağhan, G., Nuhoğlu Kibar, P., Menzi Çetin, N., Telli, E., & Akkoyunlu, B. (2017). Bilişim teknolojileri öğretmen adaylarının bakış açısından 21. yüzyıl öğrenen ve öğretmen özellikleri. *Eğitim Teknolojisi Kuram ve Uygulama, 7*(2), 215-235. https://doi.org/10.17943/etku.305062

Demir, E., & Toraman, Ç. (2021). Öğretmenlerin eğitim programı okuryazarlığı düzeyleri. *Trakya Eğitim Dergisi, 1* (3), 1516-1528.

Dilek, Ç. (2020). *Öğretmen adaylarının program okuryazarlık düzeyleri ile pedagojik bilgi ve beceri düzeylerinin incelenmesi* [Yüksek lisans tezi]. Atatürk Üniversitesi, Erzurum. .https://tez.yok.gov.tr/UlusalTezMerkezi/ veri tabanından erişildi.

Eğmir, E. & Erdem, C. (2021). Öğretmen adaylarının meslek öncesi öğretmen kimliklerinin yordayıcısı olarak 21. yüzyıl öğrenen becerileri. *Trakya Eğitim Dergisi, 11* (2), 953-968.

Engin, A. O. & Korucuk, M. (2021). Öğrencilerin 21. yüzyıl becerilerinin çeşitli değişkenler açısından incelenmesi. *Gazi Üniversitesi Gazi Eğitim Fakültesi Dergisi, 41*(2), 1081-1119. https://doi.org/10.17152/gefad.875581

Erdamar, F. S. (2020). *Sınıf öğretmenlerinin program okuryazarlık algıları ve ilkokul yöneticilerinin öğretmenlerin program okuryazarlık becerisine yönelik algılarının ilerlemeci felsefe bağlamında analizi* [Yayınlanmamış doktora tezi]. Fırat Üniversitesi, Elazığ.

Erdem, C., & Eğmir, E. (2018). Öğretmen adaylarının eğitim programı okuryazarlığı düzeyleri. *Afyon Kocatepe Üniversitesi Sosyal Bilimler Dergisi, 20*(2), 123-138.

Gani, S. A. & Mahjaty, R. (2017). English teachers' knowledge for ımplementing the 2013 curriculum. *English Education Journal, 8*(2), 199-212.

Göksün, D. O. (2016). *Öğretmen adaylarının 21. yy. öğrenen becerileri ve 21. yy. öğreten becerileri arasındaki ilişki* [Yayınlanmamış doktora tezi]. Anadolu Üniversitesi, Eskişehir.

Göksün, D. & Kurt, A. (2017). Öğretmen adaylarının 21. yy. öğrenen becerileri kullanımları ve 21. yy. öğreten becerileri kullanımları arasındaki ilişki. *Eğitim ve Bilim, 42*(190), 107-130.

Gülen, Ş. B. (2013). *Ortaokul öğrencilerinin 21. yüzyıl öğrenme becerileri ve bilişim teknolojileri ile destekleme düzeylerinin cinsiyet ve sınıf seviyesine göre incelenmesi* [Yayınlanmamış yüksek lisans tezi]. https://tez.yok.gov.tr/UlusalTezMerkezi/ veri tabanından erişildi.

Gülpek, U. (2020). *Beden eğitimi ve spor öğretmenlerinin ve öğretmen adaylarının program okuryazarlık ve beden eğitimi öğretim yeterliliği düzeylerinin incelenmesi* [Yayınlanmamış yüksek lisans tezi]. Uludağ Üniversitesi, Bursa.

Gündoğan, G. (2019). *Öğretmenlerin program okuryazarlıkları hakkında nitel bir değerlendirme.* [Yayınlanmamış yüksek lisans tezi]. https://tez.yok.gov.tr/UlusalTezMerkezi/ very tabanından erişildi.

Güneş Şınego, S., & Çakmak, M. (2021). Öğretmenlerin eğitim programı okuryazarlık düzeylerinin incelenmesi. *Kesit Akademi Dergisi, 7*(27), 233-256. Retrieved from https://dergipark.org.tr/tr/pub/kesitakademi/issue/63113/959325

Gürültü, E., Aslan, M., & Alcı, B. (2018). İlköğretim öğretmenlerinin yeterliliklerinin 21. yüzyıl becerileri ışığında incelenmesi. *Akademik Sosyal Araştırmalar Dergisi, 6* (71), 543-560.

Kahramanoğlu, R. (2019). Öğretmenlerin öğretim programı okuryazarlığına yönelik yeterlik düzeyleri üzerine bir inceleme. *Uluslararası Sosyal Araştırmalar Dergisi, 12*(65), 827-840.

Kapitzke, C. (2001). Information literacy: The changing library. *Journal of Adolescent & Adult Libraries, 31*(1), 49-52.

Karagülle, S., Varki, E. & Hekimoğlu, E. (2019). An investigation of the concept of program literacy in the context of apllicability and functionality of educational program. *Journal of Educational Reflections, 3*(2), 85-97.

Karakaş, M. M. (2015). *Ortaokul sekizinci sınıf öğrencilerinin fen bilimlerine yönelik 21.yüzyıl beceri düzeylerinin ölçülmesi* [Yayınlanmamış yüksek lisans tezi]. Eskişehir Osman Gazi Üniversitesi.

Kaufman, K. J. (2013). Ways to 21st century skills: Why students need them and ıdeas for practical ımplementation. *Kappa Delta Pi Record*, 78-83. https://doi.org/10.1080/00228958.2013.786594

Keskin, A. (2020). *Öğretmenlerin öğretim programı okuryazarlık düzeylerine yönelik algılarının belirlenmesi.* (Doktor tezi). https://tez.yok.gov.tr/UlusalTezMerkezi/ veri tabanından erişildi.

Kıyasoğlu, E., & Çeviker Ay, Ş. (2020). Sınıf öğretmenlerinin 21. yüzyıl öğrenen ve öğreten becerilerinin incelenmesi. *e-Kafkas Journal of Educational Research, 7*(3) , 240-261. https://doi.org/10.30900/kafkasegt.689976

Kivunja, C. (2014). Do you want your students to be job-ready with 21st century skills? Change pedagogies: a pedagogical paradigm shift from vygotskyian social constructivism to critical thinking, problem solving and siemens' digital connectivism. *International Journal of Higher Education, 3*(3), 81-91.

Kozikoğlu, İ., & Altunova, N. (2018). The predictive power of prospective teachers' self-efficacy perceptions of 21st century skills for their life-long learning tendencies. *Journal of Higher Education and Science, 8*(3), 522-531.

Kuyubaşıoğlu, R.M. (2019). *Öğretmenlerin eğitim programı okuryazarlığı yeterliklerinin incelenmesi.* [Yayınlanmamış yüksek lisans tezi]. Mersin Üniversitesi.

Larson, L., & Miller, T. (2011). 21st century skills: Prepare students for the future. *Kappa Delta Pi Record, 47*(3), 121-123. https://doi.org/10.1080/00228958.2011.10516575

Opoh, O. E., & Awhen, F. (2015). Teachers perceived problems of curriculum implementation in tertiary institutions in cross river state of Nigeria. *Journal of Education and Practice, 6*(19), 145-151.

Önür, Z., & Kozikoğlu, İ. (2020). The Relationship between 21st century learning skills and educational technology competencies of secondary school students. *Journal of Theoretical Educational Science, 13* (1), 65-77. https://doi.org/10.30831/akukeg.535491

Palfrey, J. & Gasser, U. (2008). *Born digital: Understanding the first generation of dijital natives.* Basic Books.

Peker, B. (2019). *Sosyal bilgiler öğretmen adaylarının 21. yüzyıl öğrenen becerilerini kullanım düzeylerinin incelenmesi* [Yayınlanmamış yüksek lisans tezi]. Niğde Ömer Halisdemir Üniversitesi.

Pellegrino, J., & Hilton, M. (2012). *Education for life and work: developing transferable knowledge and skills in the 21st century. Committee on defining deeper learning and 21st century skills.* Washington, DC: National Research Council.

Purpose, C. (2021). *Discover why universities partner with us to develop the next generation of ınclusive leaders.* Common Purpose: https://commonpurpose.org/leadership programmes/universities/?gclid=CjwKCAjw2vOLBhBPEiwAjEeK9kwusgqHc6S2ZrvtdNTpvKYdpkz xqh-hhYd1Cez36aL-oifyWWX8KxoCqoMQAvD_BwE

Roterham, A., & Willingham, D. (2009). 21st century skills: the challenges ahead. *Educational Leadership, 67*(1), 16-21.

Snavely, L., & Natasha C. (1997). The Information literacy debate. *The Journal of Academic Librarianship 23* (1), 9-13.

Sural, S., & Dedebali, N. C. (2018). A Study of curriculum literacy and ınformation literacy levels of teacher candidates in department of social sciences education. *European Journal of Educational Research, 7* (2), 303-317. https://doi.org/10.12973/eu-jer.7.2.303

Şahin, A. İ. (2020). *Sınıf öğretmeni adaylarının eğitim programı okuryazarlığı düzeylerinin incelenmesi.* [Yayınlanmamış yüksek lisans tezi]. Kastamonu Üniversitesi.

Toptal, G. (2021). *Türkçe öğretmeni adaylarının 21. yüzyıl becerileri özyeterlik algılarının çeşitli değişkenler açısından incelenmesi* [Yayınlanmamış yüksek lisans tezi]. İnönü Üniversitesi.

Trilling, B., & Fadel, C. (2009). *21st century skills: Learning for life in our times.* Jossey-Bass,

Tuncer, B. K. & Şahin, Ç. (2019). Examining the Knowledge level of pre-service teachers about curriculum. *Erzincan Üniversitesi Eğitim Fakültesi Dergisi, 21*(2), 247-260.

Ustabulut, M. Y. (2021). Yabancı dil olarak türkçe öğreten eğitmenlerin eğitim programı okuryazarlık düzeyleri. *Fırat Üniversitesi Sosyal Bilimler Dergisi, 31* (3), 1235-1243. https://doi.org/10.18069/firatsbed.941957

Yalçın, S. (2018). 21. yüzyıl becerileri ve bu becerilerin ölçülmesinde kullanılan araçlar ve yaklaşımlar. *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi, 51*(1), 183-201.

Yıldız, S. (2019). Öğretmen adaylarının program geliştirmeye ilişkin bilişsel farkındalık algıları ile eğitim programı okuryazarlıkları arasındaki ilişki. *Socıal Scıences Studıes Journal, 5*(44), 5177–5191.

Yılmaz, G., & Kahramanoglu, R. (2021). Öğretmenlerin program okuryazarlık düzeyleri, program yönelimleri ve programa bağlılık düzeyleri arasındaki ilişkinin incelenmesi. *Disiplinlerarası Eğitim Araştırmaları Dergisi, 5*(10), 178-187.