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EXAMINATION OF THE RELATIONSHIP BETWEEN TEACHER CANDIDATES' LIFELONG LEARNING TENDENCIES AND 21st CENTURY SKILLS

Research article

Dilek Yaralı https://orcid.org/0000-0003-4072-1040

Alanya Alaaddin Keykubat University, Turkey

dilek.yarali@alanya.edu.tr

Biodata:

Dilek Yaralı is an Assist. Prof. Dr. at Alanya Alaaddin Keykubat University Faculty of Education. Her research interests are education, training, teacher training, curriculum.

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Dilek Yaralı

dilek.yarali@alanya.edu.tr

Abstract

The purpose of this research was to determine the relationship between teacher candidates' multidimensional 21st century skills and lifelong learning tendencies, and to examine the teacher candidates' multidimensional 21st century skills and lifelong learning tendencies by some variables. The study group was consisted of 211 teacher candidates who studied at the Faculty of Education of Alanya Alaaddin Keykubat University in the 2021-2022 academic year. According to the research results, it was determined that teacher candidates' multidimensional 21st century skills were at the level of "I agree", their lifelong learning tendencies were at the level of "I strongly agree." In addition, significant differences were found only in the "critical thinking and problem solving", and "career consciousness" by gender variable. The statistically significant differences were determined in favor of male teacher candidates in the "critical thinking and problem solving" and in favor of female teacher candidates in the "career consciousness". There were statistically significant differences in the "career consciousness" and the "lifelong learning tendencies" by the program type. But there weren't significant differences in the scales by academic achievements. Also, there was a significant, positive, and high-level relationship between teacher candidates' multidimensional 21st century skills and lifelong learning tendencies. In future studies, lifelong learning tendencies and 21st century skills of students who different age groups can be examined in larger samples and by different variables.

Keywords: 21st century skills; teacher candidate; tendency; lifelong learning

1. Introduction

The qualities a person needed to have in the industrial periods were stated by Hamarat (2019: 8) as "to be able to trade, to follow directions, to get along with others, to be hardworking, to think professionally, to be effective, to be fast, to be honest, to be fair." However, over time, there have been some differences in the skills that people should have. As a matter of fact, the World Economic Forum (WEF) has mentioned that to develop today's innovation-driven economy, employees need skills that are different from the ones they had previously (2015). Therefore, as Cansoy (2018) stated, some (technological, social, economic) developments in the 21st century have affected expectations for the qualifications that individuals should have, and this caused some necessary changes. With all these developments, the skills the individuals were expected to gain have also changed, and in the 21st century, additional some skills have emerged in education (Ablak, 2020).

The individuals need to have some skills to be successful such as being creative and collaborative working, critical thinking, having good communication skills, technology

effectively use, being flexible, problem solving, harmonious, responsible etc. for individuals in 21st century life (Eryılmaz & Uluyol, 2015). Therefore, 21st century skills can be defined as "sets of skill that individuals living in the information age need to have and continuously develop in order to be effective and qualified" (Hamarat, 2019: 8). The World Economic Forum (WEF) examines 21st century skills in 16 different skill areas under three main categories. These are "foundational literacies (1-literacy, 2-numeracy, 3-scientific literacy, 4-ICT literacy, 5-financial literacy, 6- cultural and civic literacy), competencies (7-critical thinking/problem-solving, 8-creativity, 9-communication, 10-collaboration), character qualities (11-curiosity, 12-initiative, 13-persistence/grit, 14-adaptability, 15-leadership, 16-social and cultural awareness)" (WEF, 2015: 3). Also, in the study by Günüç, Odabaşı & Kuzu (2013: 436), a result of the definitions made by the teacher candidates, 21st century student characteristics are defined as "personal skills (cognitive, internal/concise and social), research and knowledge acquisition skills (research, learning and acquiring knowledge), creativity, innovation and career skills (career and innovation) and technology skills (use and dissemination)" under 4 main themes and 10 sub-themes".

Some skills that people should have to continue their lives and adapt to society are tried to be gained to individuals through education (Aktürk, 2022). Education is a dynamic structure organized to change human behavior in the desired direction and is an open system that is rearranged according to the evaluations (Sönmez, 2014). It is important that education systems must be updated to adapt to the period we live in (Akbulut, Erol & Say, 2018).

As a result of the rapid change of information, individuals are expected to be lifelong learners (Erdamar, Demirkan, Saraçoğlu & Alpan, 2017). The lifelong learning concept which constitutes the second subject of this study, which is not limited to space and time (Köksal & Atalay, 2019). The subject of lifelong learning attracts the highly investigated and is attention today. Among the reasons for this, we can talk about the changes in technology and science (Erdamar (Koç), 2007). According to Ministry of National Education (2009), way for an individual to keep up with the development and change brought about by the developments in science and technology is through lifelong learning.

The lifelong learning concept is defined by the Ministry of National Education (2009: 7) as "all kinds of learning activities that an individual participated in throughout his/her life to improve his/her knowledge, skills, interests and competencies with an individual, communal, social and employment-related approach." According to Bağcı (2011: 140), "lifelong learning is a concept that describes the education/learning activities that occur in every moment and area of life, regardless of the age and place limitations determined for the school system". In summary, "lifelong learning crosses sectors, promoting learning beyond traditional schooling and throughout adult life (ie post-compulsory education)" (Duta & Rafaila, 2014: 802). According to Chapman (1997), lifelong learning should include the elements of continuity, creativity, and learning (as cited in Demirel, 2004). In order to sustain lifelong learning, "(1) within basic skills; reading by understanding, basic number skills, communication, information technologies, having a wide repertoire of strategies for effective learning, to improve one's own performance, the ability to apply what is learned and improve memory, knowing how to adapt to the changing world, (2) within thinking skills; the ability to solve problems and think critically, (3) in personal characteristics; the ability to cooperate and work together with other individuals" (Erdamar (Koç), 2007: 215) are needed. Indeed, the European Parliament and the Council (2006: 13) examines key competencies related to basic competencies for lifelong learning under 8 headings that are considered equally important as "1) Communication in the mother tongue, 2) Communication in foreign languages, 3) Mathematical competence and

basic competences in science and technology, 4) Digital competence, 5) Learning to learn, 6) Social and civic competences, 7) Sense of initiative and entrepreneurship, and 8) Cultural awareness and expression".

In the teaching profession law (Ministry of National Education, 2022), the teaching profession is mentioned as "a specialized profession that undertakes education and training and related management duties". In addition, teaching profession' general competencies were defined by the Ministry of National Education in 2017. These are 3 competence areas: "professional knowledge, professional skills and attitudes and values" (Ministry of National Education, 2017: 8). Teachers are expected to have these characteristics. Therefore, the ideal teacher, according to lifelong learning, should be a person who has a harmonious personality, creative and innovative, who can question and evaluate himself/herself, who analyzes/synthesizes, who supports students to keep up with change, etc. (Köksal & Atalay, 2019). As Akbulut, Erol & Say (2018) stated, teachers today should be selected among individuals who lifelong learning.

Education systems and therefore teachers have an important role in creating a society that is lifelong learner and has 21st century skills. Because teachers are expected to bring 21st century awareness to learners to raise individuals who can struggle with what the 21st century brings (Başar, 2018). The teachers should pay attention to their behaviors both in and out of the classroom without forgetting that they are taken as role models by their students. The level of having 21st century skills and lifelong learning of teacher candidates who will be the teacher of the future is a significant issue. It is important for individuals to have 21st century skills to acquire lifelong learning (Kozikoğlu & Altunova, 2018). In short, it is important for teacher candidates to improve these skills to provide their students with 21st century skills in the future (Ecevit & Kaptan, 2021).

When the literature is examined, there have been many studies examining the 21st century skills. Among these studies are the ones conducted on teacher candidates (Ablak, 2020; Geçgel, Kana, Vatansever & Çalık, 2020), high school senior students (Aktürk, 2022), high school students (Çelik, 2021), midwifery and nursing students (Karadaş, Kaynak, Ergün, & Palas Karaca, 2021). In addition to these, there are studies that examine the relationships between 21st century skills and different concepts in the literature. Some of them can be listed as: examination of the relationship between teacher candidates' educational beliefs and 21st century skills (Gökbulut, 2020), opinions of Science teachers on 21st century skill levels (Kavukçu, 2021), examining of primary school teachers' 21st century skills use and teaching motivation levels (Bulut, 2022), 21st century skills in Science Education of secondary school 8th grade students (Karakaş, 2015), the relationship of the 21st century skills of high school students with student burnout and school engagement (Kaya, 2017), 21st century skills of children aged 3-6 years (Dinler, Simsar & Yalçın, 2021), examination of the relationship between the 21st century skills and competition styles of preschool children (Elçi, 2021), examination of the relationship between the self-regulation skills and 21st century skills of 5-6 years old children (Güngör, 2021). In addition, while the information literacy states of teachers and pre-service teachers based on 21st century skills (Atakisi, 2019), and the 21st century learner and teacher characteristics were examined according to the perspectives of ICT preservice teachers in the study conducted by Dağhan, Nuhoğlu Kibar, Menzi Çetin, Telli & Akkoyunlu (2017). Also, in the study conducted by Korucu & Ünüvar (2020), the relationship between the education received by teacher candidates studying in the department of computer and instructional technologies teaching, the qualification of it leadership and 21st century skills were examined. In the study conducted by Varki (2020), prospective teachers' tendencies about

21st century skills and creative thinking trends were investigated. In the study conducted by Kalyoncu (2012), teacher and administrator views on some basic skills that 21st century students should have been examined. In the study conducted by Günüç, Odabaşı & Kuzu (2013), the 21st century student characteristics were defined by the student teachers, while the relationship of 21st century skills on students' attitude and perception towards physics was examined by Tuan Soh, Mohamad Arsad & Osman (2010).

When the literature is examined, the studies on lifelong learning tendencies have been found. Lifelong learning tendencies of teacher candidates (Bulaç & Kurt, 2019; Duymuş & Sulak, 2018; Güzel, 2017; Kurt, Cevher & Arslan, 2019; Şahin, Sarıtaş & Çatalbaş, 2020; Tunca, Alkın Şahin, & Aydın, 2015), lifelong learning tendencies of undergraduate/university students (Diker Coşkun, 2009; Gökyer & Türkoğlu, 2018), lifelong learning tendencies of teachers (Ayaz, 2016; Yaman, 2014) were examined in the literature. In addition, there are studies examining the relationships between the lifelong learning tendencies of teacher candidates and different concepts in the literature. Some of them are: the relationship between "*lifelong learning tendencies of teacher candidates"* and their occupational anxiety (Akbulut, Erol & Say, 2018), the relationship between career development desires (Aydın, 2018), the relationship between digital literacy levels (Boyacı, 2019), the relationship between self-efficacy expectation and personality traits with lifelong learning tendency (Ekşioğlu, Tarhan & Çetin Gündüz, 2017), relationship between information literacy skills (Yasa, 2018). Also, investigation of pre-service teachers' lifelong learning tendencies and their individual innovativeness levels (Yenice & Alpak Tunç, 2019), investigation of library habits with living dimension learning tendencies of teacher candidates (Yenice, Demircioğlu Faydalıgül, & Yavaşoğlu, 2020), examination of individual innovation levels and lifelong learning trends of students with Physical Education and Sports High School students (Mülhim, 2018), individual innovativeness levels and lifelong learning tendencies of teacher candidates in pedagogical formation education certificate program (Öztürk Yurtseven & Aldan Karademir, 2017). In addition to these, there are studies examining the relationship between autonomous learning and lifelong learning (Yurdakul, 2016) and the relationship between teachers' work values and lifelong learning tendencies (Tanatar & Alpaydın, 2019). Also, Crick, Broadfoot & Claxton (2004) developed an effective lifelong learning inventory, and Hojat, Nasca, Erdmann, Frisby, Veloski, & Gonnella (2003) developed of an instrument to measure lifelong learning among physicians. Assessing readiness for lifelong learning (Litzinger, Wise, Lee, Simpson, & Joshi, 2001); defining, teaching, and assessing of lifelong learning skills (Mourtos, 2003), lifelong learning attitudes of postgraduate students (Singh & Singh, 2014) were investigated.

In addition, in the study conducted by Erdoğan & Eker (2020) in the literature, the relationship between the 21st century skills and lifelong learning tendencies of Turkish pre-servise candidates was examined, and in the study conducted by Kozikoğlu & Altunova (2018), the predictive power of teacher candidates' the self-efficacy perceptions of 21st century skills for their lifelong learning tendencies were examined. In addition, the relationship between the lifelong learning tendencies of secondary education teachers and their self-efficacy perception related to 21st century skills (Özdemir, 2022) and the 21st century skills and lifelong learning tendencies of teacher candidates (Soruklu, 2022) were examined. When these studies are examined, it can be said that the number of studies examining the relationship between 21st century skills and lifelong learning tendencies of teacher candidates is limited. It was determined that the study conducted by Erdoğan & Eker (2020) was carried out only with

Turkish teacher candidates and the study conducted by Özdemir (2022) with teachers. In the study conducted by Kozikoğlu & Altunova (2018), the self-efficacy perceptions of teacher candidates regarding 21st century skills were examined and, in the study conducted by Soruklu (2022), 21st century skills and lifelong learning tendencies of teacher candidates were examined according to gender and department variables and the relationship between them was mentioned. In this study, teacher candidates' lifelong learning tendencies and the 21st century skills were be analyzed by their gender, the type of program and academic achievement, and it was be tried to determine if there is a relationship between them.

1.1. Purpose of the research

The purpose of this study is to examine if there is a significant relationship between "multidimensional 21st century skills" and "lifelong learning tendencies". Sub-problems of the research:

1. "What is the level of teacher candidates' lifelong learning tendencies and multidimensional 21st century skills?"
2. "Do teacher candidates' lifelong learning tendencies and multidimensional 21st century skills differ significant by gender variable?"
3. "Do teacher candidates' lifelong learning tendencies and multidimensional 21st century skills differ significant by the program type variable?"
4. "Do teacher candidates' lifelong learning tendencies and multidimensional 21st century skills differ significant by the academic achievement variable?"
5. "Is there a significant relationship between teacher candidates' multidimensional 21st century skills and lifelong learning tendencies?"

2. Method

This stage of the study includes information about the research model, the study group, data collection tools, and data processing and analysis.

2.1. Research Model

The purpose of this research was to determine the relationship between teacher candidates' multidimensional 21st century skills and lifelong learning tendencies, and to examine the teacher candidates' multidimensional 21st century skills and lifelong learning tendencies by some variables. The survey model was used in the research. According to Karasar (2007), survey models are a model that describe a past or present situation as it is.

2.2. Study group

211 teacher candidates who studied at Alanya Alaaddin Keykubat University in the 2021-2022 academic year consisted of the study group. The appropriate sampling method was used in determining the study group. Descriptive statistics of participants is presented in the table below.

Table 1. Demographic information of teacher candidates in the study group

	Male	**Female**	**Total**

		N	%	N	%	N	%
Program Type	Guidance and Psychological Counseling	22	10.43	65	30.81	87	41.23
	Science Teaching	12	5.69	32	15.17	44	20.85
	English Language Teaching	13	6.16	15	7.11	28	13.27
	Elementary Mathematics Teaching	22	10.43	30	14.22	52	24.65
Academic achievement	2.50 and lower	8	3.79	6	2.84	14	6.64
	2.51-3.0	10	4.74	10	4.74	20	9.48
	3.01-3.50	33	15.64	75	35.55	108	51.18
	3.51-4.0	18	8.53	51	24.17	69	32.70
	Total	69	32.70	142	67.30	211	100

142 female teacher candidates (67.30%) and 69 male teacher candidates (32.70%) participated in the research. 52 of the participants were from Elementary Mathematics Teaching (24.65%), 44 of the participants were from Science Teaching (20.85%), 28 of the participants were from English Teaching (13.27%), and 87 of the participants were from Guidance and Psychological Counseling (41.23%).

Ethics committee approval was obtained for the research from Alanya Alaaddin Keykubat University with the decision numbered 2021/14 from the meeting numbered 8 on 11.11.2021.

2.3. Data Collection Tools

In the research, data were collected through the "multidimensional 21st century skills" and "lifelong learning trends" scales. There are 17 items within two sub-dimensions in the lifelong learning tendencies scale, and the score obtained from the scale is between 17 and 85 (Gür Erdoğan, 2014; Gür Erdoğan & Arsal, 2016). The items on the scale are scored between strongly agree and strongly disagree, and the Cronbach's alpha internal consistency coefficient of scale is determined to be α=.86 (Gür Erdoğan, 2014; Gür Erdoğan & Arsal, 2016). The reliability coefficient of overall scale was found as α= 0.87 in this study.

Çevik & Şentürk (2019) developed multidimensional 21st century skills scale by for students between the ages of 15 and 25. There are the five sub-dimensions: "knowledge and technology literacy, entrepreneurship and innovation, critical thinking and problem solving, social responsibility and leadership and career consciousness" (41 items). The items on the scale are scored between strongly agree and strongly disagree, and the score obtained from the scale is between 41 and 205 (Çevik & Şentürk, 2019). The Cronbach Alpha reliability coefficient of

scale was found to be α=0.84 for the "knowledge and technology literacy", α=0.79 for the "entrepreneurship and innovation", α=0.76 for the "critical thinking and problem solving", α=0.73 for the "social responsibility and leadership", α=0.75 for the "career consciousness", and α=0.86 for the overall scale (Çevik & Şentürk, 2019). 16th, 17th, 18th, 19th, 20th, 21st, and 35th items in the scale were reverse coded in this study. The reliability coefficient of overall scale was found as α= 0.89 in this study.

2.4. Data Processing and Analysis

The study, firstly, descriptive statistics were calculated related to the scales, and teacher candidates' participation levels were determined. The research tried to determine if teacher candidates' lifelong learning tendencies and multidimensional 21st century skills differ statistically significant by gender, type of program, and academic achievement variables. For this purpose, "the standard deviation, Skewness, and Kurtosis values of each variable" were determined in both scales. The normality of the scales was checked by using the mean scores, median, mode, Kurtosis, and Skewness values. At the end of these reviews, it was decided to that the "t-test for independent samples for gender variable and the Kruskal Wallis H test for program type and academic achievement variables" were applied in the research. Simple correlation analysis was applied to analyze the relationships between teacher candidates' multidimensional 21st century skills and lifelong learning tendencies.

3. Findings

The findings are presented respectively.

3.1. "Level of teacher candidates' multidimensional 21st century skills and lifelong learning tendencies"

Descriptive statistics related to teacher candidates' scores in the lifelong learning trends and multidimensional 21st century skills scales are presented in the table 2.

Table 2. Descriptive statistics related to teacher candidates' scores in scales (N=211)

Sub-Dimension/Scales	Number of Items	Minimum-Maximum	Mean	Item mean	Participation Level	SS
Knowledge and Technology Literacy	15	40-75	61.45	4.10	"I Agree"	6.83
Critical Thinking and Problem Solving	6	10-30	24.32	4.05	"I Agree"	4.45
Entrepreneurship and Innovation	10	16-50	35.92	3.59	"I Agree"	6.70
Social Responsibility and Leadership	4	8-20	14.85	3.71	"I Agree"	2.55

Career Consciousness	6	15-30	26.73	4.46	"I Strongly Agree"	3.09
Overall Multidimensional 21st Century Skills	41	110-196	163.26	3.98	"I Agree"	16.073
Lifelong Learning Tendencies	17	50-85	73.01	4.29	"I Strongly Agree"	7.26

When the responses of the participants in the lifelong learning trends scale were evaluated, it was seen that they rated ($\bar{x}$=4.29) as "I strongly agree." In addition, when the responses of the participants in the multidimensional 21st century skills scale were evaluated, it was seen that they rated the "knowledge and technology literacy" sub-dimension ($\bar{x}$ =4.10) as "I agree", "critical thinking and problem-solving" sub-dimension ($\bar{x}$=4.05) as "I agree", "entrepreneurship and innovation" sub-dimension ($\bar{x}$ =3.59) as "I agree", "social responsibility and leadership" sub-dimension ($\bar{x}$ =3.71) as "I agree", "career consciousness" sub-dimension ($\bar{x}$ =4.46) as "I strongly agree", and overall scale ($\bar{x}$ =3.98) as "I agree."

3.2. "Investigation of teacher candidates' lifelong learning tendencies and multidimensional 21st century skills by gender variable"

It was examined if there were significant differences between scores related to teacher candidates' both lifelong learning tendencies and multidimensional 21st century skills by gender variable. The t-test for the independent samples was applied for solution of this sub-problem. The findings are presented in the table 3.

Table 3. Comparison of teacher candidates' lifelong learning tendencies and multidimensional 21st century skills scores by gender variable (N=211)

Sub-Dimension/Scales	Gender	N	Mean	SS	SD	t	p
Knowledge and Technology Literacy	Female	142	61.1479	6.58921	209	0.907	0.365
	Male	69	62.0580	7.31615			
Critical Thinking and Problem Solving	Female	142	23.8099	4.65388	209	2.407	0.017*
	Male	69	25.3623	3.80391			
Entrepreneurship and Innovation	Female	142	35.6127	6.64804	209	0.954	0.341
	Male	69	36.5507	6.81593			
Social Responsibility and Leadership	Female	142	14.8873	2.47856	209	0.318	0.751
	Male	69	14.7681	2.70155			

Career Consciousness	Female	142	27.1620	2.73832	209	2.716	0.008*
	Male	69	25.8406	3.56298			
Overall Multidimensional 21st Century Skills	Female	142	162.6197	15.45285	209	0.830	0.407
	Male	69	164.5797	17.32170			
Lifelong Learning Tendencies	Female	142	73.4648	7.08376	209	1.309	0.192
	Male	69	72.0725	7.58349			

p*<0.05

There were statistically significant differences between the average score of female teacher candidates ($\bar{x}_{\text{Critical Thinking and Problem Solving}}$ =23.8099, $\bar{x}_{\text{Career Consciousness}}$ =27.1620) and male teacher candidates ($\bar{x}_{\text{critical Thinking and Problem Solving}}$ =25.3623, $\bar{x}_{\text{Career Consciousness}}$ =25.8406) in the "critical thinking and problem solving, and career consciousness" sub-dimensions [$(t(209)_{\text{Critical Thinking and Problem Solving}}$ =2.407, p<0.05; $t(209)_{\text{Career Consciousness}}$=2.716, p<0.05)]. While the statistically significant differences were found in favor of female participants in the career consciousness, significant differences were found in favor of male participants in the critical thinking and problem-solving. However, there were no statistically significant differences between female and male teacher candidates' average scores in the “lifelong learning trends scale", and other sub-dimension and overall of “multidimensional 21st century skills scale” [$t(209)_{\text{Knowledge and Technology Literacy}}$=0.907, p>0.05; $t(209)_{\text{Entrepreneurship and Innovation}}$=0.954, p>0.05; $t(209)_{\text{Social Responsibility and Leadership}}$=0.318, p>0.05; $t(209)_{\text{Overall Multidimensional 21st Century Skills}}$ =0.830, p>0.05, $t(209)_{\text{Lifelong Learning Tendencies}}$=1.309, p>0.05].

3.3. “Investigation of teacher candidates’ lifelong learning tendencies and multidimensional 21st century skills by program type variable”

It was investigated if there were significant differences between scores related to the teacher candidates’ both lifelong learning tendencies and multidimensional 21st century skills by the program type variable. The Kruskal Wallis H test was applied for solution of this sub-problem. The findings are presented in the table 4.

Table 4: Comparison of teacher candidates’ lifelong learning tendencies and multidimensional 21st century skills scores by program type variable (N=211)

Sub-dimension/ Scales	Type of program	N	Mean Rank	Chi Square	Degree of Freedom	Level of Significance (p)
Knowledge and Technology Literacy	Science Teaching	44	92.34	4.802	3	0.187
	Guidance and Psychological Counseling	87	113.03			
	English Language Teaching	28	117.00			

	Elementary Mathematics Teaching	52	99.87			
	Total	211				
Critical Thinking and Problem Solving	Science Teaching	44	110.74	2.706	3	0.430
	Guidance and Psychological Counseling	87	109.60			
	English Language Teaching	28	109.93			
	Elementary Mathematics Teaching	52	93.86			
	Total	211				
Entrepreneurship and Innovation	Science Teaching	44	93.81	3.138	3	0.371
	Guidance and Psychological Counseling	87	111.52			
	English Language Teaching	28	99.20			
	Elementary Mathematics Teaching	52	110.74			
	Total	211				
Social Responsibility and Leadership	Science Teaching	44	97.14	3.204	3	0361
	Guidance and Psychological Counseling	87	109.33			
	English Language Teaching	28	120.16			
	Elementary Mathematics Teaching	52	100.30			
	Total	211				
Career Consciousness	Science Teaching	44	96.58	8.743	3	0.033*
	Guidance and Psychological Counseling	87	120.58			
	English Language Teaching	28	98.34			

	Elementary Mathematics Teaching	52	93.70			
	Total	211				
Overall Multidimensional 21st Century Skills	Science Teaching	44	93.11	4.840	3	0.184
	Guidance and Psychological Counseling	87	115.36			
	English Language Teaching	28	110.27			
	Elementary Mathematics Teaching	52	98.94			
	Total	211				
Lifelong Learning Tendencies	Science Teaching	44	86.57	8.472	3	0.037*
	Guidance and Psychological Counseling	87	118.03			
	English Language Teaching	28	110.13			
	Elementary Mathematics Teaching	52	100.09			
	Total	211				

p*<0.05

There were significant differences only in the "career consciousness" and "lifelong learning tendency" by the program type [(X^2 Knowledge and Technology Literacy=4.802, SD=3, p>0.05), (X^2Critical Thinking and Problem Solving=2.706, SD=3, p>0.05), (X^2Entrepreneurship And Innovation =3.138, SD=3, p>0.05), (X^2Social Responsibility and Leadership=3.204, SD=3, p>0.05), (X^2Overall Multidimensional 21st Century Skills=4.840, SD=3, p>0.05), (X^2Career Consciousness =8.743, SD=3, p<0.05), (X^2Lifelong Learning Tendencies =8.472, SD=3, p<0.05)].

Multiple comparisons were made in SPSS to determine which type of program caused the significant difference. As a result of the multiple comparisons, it was seen that there were significant differences in the career consciousness sub-dimension between teacher candidates who studied in Guidance and Psychological Counselling (Median=29) and Elementary Mathematics Teaching program (Median=27). This significant difference was found to be in favor of teacher candidates who studied in the Guidance and Psychological Counselling program (U=1687.00, z=2.536). Also, it was seen that there were significant differences between teacher candidates who studied in Guidance and Psychological Counselling (Median=75) and Science Teaching program (Median=71) in the lifelong learning tendencies. This significant difference was found to be in favor of teacher candidates who studied in the Guidance and Psychological Counselling program (U=1344.50, z=2.779).

3.4. "Investigation of teacher candidates' lifelong learning tendencies and multidimensional 21st century skills by academic achievement variable"

It was investigated if there were statistically significant differences between scores related to teacher candidates' both lifelong learning tendencies and multidimensional 21st century skills by the academic achievement variable. The Kruskal Wallis H test was applied for solution of this sub-problem. The findings are presented in Table 5.

Table 5: Comparison of teacher candidates' lifelong learning tendencies and multidimensional 21st century skills scores by academic achievement variable (N=211)

Sub-dimension/ Scales	Academic achievement	N	Mean Rank	ChiSquare	Degree of Freedom	Level of Significance (p)
Knowledge and Technology Literacy	2.50 and lower	14	100.00	0.668	3	0.881
	2.51-3.00	20	115.50			
	3.01-3.50	108	104.77			
	3.51-4.00	69	106.39			
	Total	211				
Critical Thinking and Problem Solving	2.50 and lower	14	115.75	3.832	3	0.280
	2.51-3.00	20	83.53			
	3.01-3.50	108	104.95			
	3.51-4.00	69	112.17			
	Total	211				
Entrepreneurship And Innovation	2.50 and lower	14	131.61	10.974	3	0.012*
	2.51-3.00	20	122.85			
	3.01-3.50	108	92.92			
	3.51-4.00	69	116.39			
	Total	211				

Social Responsibility and Leadership	2.50 and lower	14	125.89	2.647	3	0.449
	2.51-3.00	20	97.83			
	3.01-3.50	108	108.50			
	3.51-4.00	69	100.43			
	Total	211				
Career Consciousness	2.50 and lower	14	123.14	2.326	3	0.508
	2.51-3.00	20	113.63			
	3.01-3.50	108	100.88			
	3.51-4.00	69	108.33			
	Total	211				
Overall Multidimensional 21st Century Skills	2.50 and lower	14	121.32	3.057	3	0.383
	2.51-3.00	20	109.13			
	3.01-3.50	108	99.24			
	3.51-4.00	69	112.57			
	Total	211				
Lifelong Learning Tendencies	2.50 and lower	14	124.32	2.351	3	0.503
	2.51-3.00	20	113.85			
	3.01-3.50	108	101.08			
	3.51-4.00	69	107.70			
	Total	211				

p*<0.05

There were statistically significant differences between teacher candidates' scores by the academic achievement variable only in the "entrepreneurship and innovation sub-dimension" [($X^2_{\text{Entrepreneurship and Innovation}}$=10.974, SD=3, p<0.05); ($X^2_{\text{Knowledge and Technology Literacy}}$ =0.668, SD=3, p>0.05; $X^2_{\text{Critical Thinking and Problem Solving}}$ =3.832, SD=3, p>0.05; $X^2_{\text{Social Responsibility and Leadership}}$=2.647, SD=3, p>0.05; $X^2_{\text{Career Consciousness}}$ =2.326, SD=3, p>0.05; $X^2_{\text{Overall Multidimensional 21st Century Skills}}$ =3.057, SD=3, p>0.05; $X^2_{\text{Lifelong Learning Tendencies}}$ =2.351, SD=3, p>0.05)]. However,

a result of the multiple comparisons made in SPSS, no significant differences were observed by academic achievement variable.

3.5. "Investigation of relationship between teacher candidates' lifelong learning tendencies and multidimensional 21st century skills"

It was examined if there was a significant relationship between teacher candidates' lifelong learning tendencies and multidimensional 21st century skills. The Pearson Product-Moment Correlation Coefficient was applied for solution of this sub-problem. The findings are presented in Table 6.

Table 6: Pearson Moments correlation analysis results (N=211)

	Lifelong Learning Tendencies		
	r	r^2	p
Multidimensional 21st Century Skills	0.736	0.542	0.000

As a result of a simple correlation analysis, it was found that there was a significant and positive relationship between participants' "lifelong learning tendencies and multidimensional 21st century skills" ($r=0.736$, $r^2 = 0.542$, $p<0.01$). Regarding the subject, according to Büyüköztürk (2014), relation between the values of the correlation coefficient as an absolute value are as follows: (0.00-0.30= "low", 0.30-0.70= "moderate" and 0.70-1.00= "high" relationship). In the light of this information, it can be said that there is a high, positive, and significant relationship between teacher candidates' multidimensional 21st century skills and lifelong learning tendencies. When considering the coefficient of determination ($r^2= 0.542$), it was seen that the relationship between teacher candidates' lifelong learning tendencies and multidimensional 21st century skills was 54.2 %.

4. Conclusion and Discussion

The purpose of this research was to examine the teacher candidates' multidimensional 21st century skills and lifelong learning tendencies by gender, type of program, and academic achievement variables and to determine the relationship between teacher candidates' multidimensional 21st century skills and lifelong learning tendencies. The results of the research are presented below, respectively:

4.1. When the teacher candidates' the responses were evaluated, it was observed that they rated on the lifelong learning trends scale ($\bar{x}=4.29$) as "I strongly agree". This conclusion of the research is similar to the conclusion of the study conducted by Soruklu (2022). Because, in this research, the participants rated on the lifelong learning trends scale at the "I strongly agree" level. In the studies conducted by Boyacı (2019) and Gür Erdoğan (2014), the participants' lifelong learning tendencies were found at a high level. Also, in the studies conducted by Boztepe & Demirtaş (2018) and Şahin et al. (2020), the participants' lifelong learning tendencies were found above the medium value/scale average.

4.2. When the teacher candidates' the responses in the multidimensional 21st century skills scales were evaluated, it was observed that they rated on the only career consciousness sub-dimension at the "I strongly agree" level. It was determined that participants responded at the

" I agree" level for other sub-dimensions and the overall scale. In the multidimensional 21st century skills scale, it was determined that while the “career consciousness” had the highest average, the “entrepreneurship and innovation” had the lowest average. This conclusion of the research is similar to the conclusion of the studies conducted by both Soruklu (2022) and Ablak (2020). Because in these studies, participants rated the highest score to the career consciousness, while they rated the lowest score to the entrepreneurship and innovation. However, in the studies conducted by Geçgel et al. (2020) and Varki (2020), the participants rated the highest average to the critical thinking and problem-solving sub-dimension, while the participants rated the lowest average to career consciousness.

4.3. In the research, the statistically significant differences weren’t observed in lifelong learning tendencies of participants by gender variable. Conclusion of the studies conducted by Boztepe & Demirtaş, 2018; Güzel, 2017; Mülhim, 2018; Öztürk-Yurtseven & Aldan-Karademir, 2017; Soruklu, 2022 are similar to this result of the research. Also, significant differences were found in favor of male participants in the study conducted by Ekşioğlu et al. (2017), and significant differences were found in favor of the female participants in the studies conducted by Boyacı, (2019; Bulaç & Kurt (2019); Erdoğan & Eker (2020); Gökyer & Türkoğlu (2018); Şahin et al. (2020).

4.4. In the research, the statistically significant differences were found only in the "career consciousness" and "critical thinking and problem solving" sub-dimensions of the multidimensional 21st century skills scale by gender variable. The statistically significant differences were determined in favor of male teacher candidates in the "critical thinking and problem solving" and in favor of female teacher candidates in the "career consciousness". Regarding this conclusion of the research, in the studies conducted by Soruklu (2022), Ablak (2020), Erdoğan & Eker (2020), and Korucu & Ünüvar (2020) significant differences weren’t determined between the 21st century skills of female and male participants. But significant differences were found in favor of female participants only in the “career consciousness” sub-dimension (Aktürk, 2022) and only in the "entrepreneurship and innovation" sub-dimension of scale (Varki, 2020).

4.5. In the research, the statistically significant differences were found in lifelong learning tendencies of participants by the program type. Regarding this conclusion of the research, in the studies conducted by Güzel (2017) and Soruklu (2022), statistically significant differences were not found by the program/department of the participants. However, in the studies conducted by Boyacı (2019), and Bulaç & Kurt (2019), the statistically significant differences were found by this variable.

4.6. In the research, the statistically significant differences were found only in “career consciousness” sub-dimension of the multidimensional 21st century skills scale by the type of program. In the research conducted by Varki (2020), the statistically significant differences were found in the sub-dimensions of "knowledge and technology literacy", "entrepreneurship and innovation", "career consciousness" and overall scale. In addition, in the study conducted by Soruklu (2022), the significant differences were found in the sub-dimensions of "entrepreneurship and innovation", "social responsibility and leadership", "career consciousness” and overall scale by the type of program.

4.7. In the research, there weren’t the statistically significant differences in the lifelong learning tendencies of participants by their academic achievements.

4.8. In the research, there weren't the statistically significant differences in multidimensional 21st century skills of participants by their academic achievements. This conclusion of the research is parallel with the conclusion of the study conducted by Ablak (2020). Because in this study, no significant differences were found in the 21st century skills of the participants by the general academic achievements.

4.9. It was determined that there was a high, positive, and significant relationship between teacher candidates' multidimensional 21st century skills and lifelong learning tendencies. In the studies conducted by Erdoğan & Eker (2020) and Soruklu (2022), a positive and significant relationship between participants' 21st century skills and the lifelong learning tendencies was found. Accordingly, it can be said that if the multidimensional 21st century skills scores of teacher candidates increase, their lifelong learning tendencies scores will increase, or that with the increase in teacher candidates' lifelong learning tendencies scores, their multidimensional 21st century skills scores will increase.

4.1. Recommendations

In future studies, lifelong learning tendencies and 21st century skills of students who different age groups can be examined in larger samples and by different variables (gender, age, education program, class level, parent education levels, parent professions, lessons generally preferred teaching methods, their educational philosophies, etc.).

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