Yaşam Boyu Öğrenme & 21. Yüzyıl Becerileri
Lifelong Learning & 21st Century Skills

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Cilt: 12, Sayı: 1, 2025
Doi: 10.21020/husbfd.1270924

Özgün Araştırma

Hemşirelik Öğrencilerinin Yaşam Boyu Öğrenme Tutumları ile 21. Yüzyıl Becerileri Arasındaki İlişki

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Gönderim Tarihi: 25 Mart, 2023 **Kabul Tarihi:** 21 Ağustos, 2024 **Basım Tarihi:** 30 Nisan, 2025
Erken Görünüm Tarihi: 31 Ocak, 2025

Öz

Amaç: Bilimsel, teknolojik ve ekonomik gelişmeler, hemşirelerin yaşam boyu öğrenen ve 21. yüzyıl becerilerine sahip hemşireler olarak mezun olmalarını gerektirmektedir. Araştırmanın amacı, hemşirelik öğrencilerinin yaşam boyu öğrenme tutumları ile 21. yüzyıl becerilerini ve aralarındaki ilişkiyi belirlemektir.
Gereç ve Yöntem: Araştırma kesitsel, tanımlayıcı ve ilişki arayıcı bir desende olup 338 öğrenci ile gerçekleştirilmiştir. Araştırmanın verileri "Bilgi Formu", "Sağlıkta Yüksek Öğrenim Öğrencileri İçin Yaşam Boyu Öğrenme Tutum Ölçeği" ve "Çok Boyutlu 21. Yüzyıl Becerileri Ölçeği" kullanılarak toplanmıştır.
Bulgular: Araştırmaya alınan öğrencilerin eleştirel düşünme ve problem çözme becerileri puan ortalamaları yüksek (25,11±4,91), kariyer farkındalığı puan ortalamaları (8,86±3,37) düşüktür. Hemşirelik öğrencilerinin lise mezuniyeti, mezuniyet sonrası kariyer planı ve meslek kurslarına katılma durumları ile yaşam boyu öğrenme tutumları ve 21. yy. becerileri arasında anlamlı fark bulunmuştur ($p<0,05$). Araştırma kapsamındaki hemşirelik öğrencilerinin yaşam boyu öğrenme tutumları ile 21. yüzyıl becerilerinin alt boyutları olan eleştirel düşünme ve problem çözme becerileri düzeyleri arasında pozitif yönde güçlü bir ilişki bulunmuştur. Ancak öğrencilerin yaşam boyu öğrenme tutumları ile kariyer farkındalığının 21. yüzyıl becerileri alt boyutları ile bilgi ve teknoloji okuryazarlığı arasında negatif yönde zayıf bir ilişki bulunmuştur.
Sonuç: Araştırmanın sonuçları, hemşirelik öğrencilerinin eleştirel düşünme ve problem çözme becerilerinin yüksek olduğunu, yaşam boyu öğrenme tutumları arttıkça eleştirel düşünme ve problem çözme becerilerinin de olumlu yönde arttığını göstermiştir.

Anahtar kelimeler: *yaşam boyu öğrenme, 21. yüzyıl becerileri, hemşirelik eğitimi, sürekli eğitim*

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*1. Uluslararası Hemşirelik Eğitiminde Program Geliştirme Kongresi (2021) sözlü bildiri olarak sunulmuştur.

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Original Research

The Relationship Between Lifelong Learning Attitudes and 21st Century Skills of Nursing Students

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Submission Date: March 25th, 2023 **Acceptance Date:** August 21st, 2024 **Pub.Date:** April 30th, 2025
Online First Date: January 31st, 2025

Abstract

Objectives: Scientific, technological, and economic developments require nurses to graduate as lifelong learners, and nurses with 21st century skills. The purpose of the research is to determine nursing students' lifelong learning attitudes and 21st century skills and the relationship between them.
Materials and Methods: This research is a cross-sectional, descriptive, and correlational design, and was carried out with 338 students. The data for the research were collected using "Information Form", " Lifelong Learning Attitude Scale for Healthcare Students in Higher Education " and "Multidimensional 21st Century Skills Scale".
Results: The critical thinking and problem solving skills of the students included in the research have a high mean score (25,11±4,91) however, their mean scores of career awareness (8,86±3,37) are low. The significant difference was found between the conditions such as high school graduation, post-graduation career plan, and participation in vocational courses of nursing students, and their lifelong learning attitudes and 21st century skills ($p<0,05$). The strong positive relationship was found between the lifelong learning attitude of the nursing students within the scope of the research, and their levels of critical thinking and problem solving skills, which are the sub-dimensions of 21st century skills. The weak negative relationship was found between students' lifelong learning attitude and 21st century skills sub-dimensions of career awareness, and information and technology literacy.
Conclusion: The results of the research showed that nursing students' critical thinking and problem solving skills were high and as their lifelong learning attitudes increased, their critical thinking and problem solving skills also increased positively.

Keywords: *lifelong learning, 21st century skills, nursing education, continuing education*

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* The 1st International Congress on Curriculum Development in Nursing Education (2021) was presented as an oral presentation.

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Introduction

Scientific, technological, and economic developments occurring at a rapid pace globally affect health care services. These developments lead to an increase in expectations in health services, and therefore bring cost-effective practices to the forefront in care, and treatment, and thus require constant updating of knowledge, and skills for nurses (Jantzen, 2022; Şenyuva, 2013). Therefore, it is expected that nurses will be trained as lifelong learners during their education and graduate as nurses possessing 21st century skills (Qalehsari et al., 2017). The American Association of Medical Colleges (AAMC) and the American Association of Colleges of Nursing (AACN) state in their Conference Report on Lifelong Learning in Medicine and Nursing that more emphasis should be placed on lifelong learning in healthcare professionals, and recommend that academic institutions support, and encourage the development of students' collaboration, and lifelong learning skills for graduates with lifelong learning skills (AAMC & AACN, 2010; Dee & Reynolds, 2013).

When the literature on 21st century skills is examined, it is observed that there are different classifications. As part of the Partnership for 21st Century Learning (P21), 2019 project; the 21st century skills have been classified as life, and professional skills (resilience and adaptability, entrepreneurship, social orientation, productivity, leadership and responsibility, social, and intercultural skills); learning and innovation skills (critical thinking, communication, collaboration, creativity) and information and communication technology skills (information, media, communication technologies literacy) (Shadiev & Wang, 2022). Under the Organization for Economic Cooperation and Development (OECD) Learning Compass 2030; it is mentioned that every student should acquire three transformative competencies namely creating new values (collaboration, critical thinking, innovative solution), taking responsibility, removing stress, and dilemmas (Martin, 2018; OECD, 2018). At the World Economic Forum (2015), the 21st century skills that students should have were classified as basic skills (numeracy, ICT literacy, scientific, financial literacy, cultural, and civic literacy), competencies (critical thinking/problem solving, creativity, communication, cooperation), and character traits (entrepreneurial, curious, resilient, courageous, adaptable, leader, having social and cultural consciousness) and it has been stated that lifelong learning covers the whole (Valtonen et al., 2021).

When the literature on lifelong learning is examined, it is seen that the concept was first put forward by John Dewey, Eduard Lindeman, and Basil Yeaxle in the 1920s and came to the international agenda with the reports of United Nations Educational, Scientific and Cultural

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Organization (UNESCO) and OECD in the 1970s and used together with the concept of education. The concept was brought to the agenda again by UNESCO in 1996, and this same year was accepted as the year of lifelong learning by the European Union. In 2000, the European Union Commission organized the "Lifelong Learning Memorandum" focusing on "lifelong learning processes in the 21st century" (Kaya, 2014; Şahin et al., 2020). In this respect, lifelong learning is considered as the process of developing knowledge, skills, attitudes, competences, and qualifications on a constant basis. Lifelong learning processes, which individuals perform formally or informally at every stage of their lives, offer higher-level learning opportunities, and allow development of their knowledge and skills (Kaya, 2014). At the same time, lifelong learning requires improvement of continuity, creativity, and self-directed learning skills. This clearly demonstrates the need for 21st century skills (Kozikoğlu & Altunova, 2018). In today's conditions, it is necessary for an individual to take lifelong learning as a guide, and acquire 21st century skills including learning, and innovation skills, life and career skills, information, media and technology skills, problem solving, ability to work in harmony, entrepreneurship, responsibility, critical, and creative thinking skills (Kozikoğlu & Altunova, 2018). In this context, students should be provided with self-learning, critical thinking and problem solving skills and their curiosity and desire to learn should be increased and ultimately, they should be raised as generations that adopt lifelong learning as a habit (Chukwuedo et al., 2021; Jin & Ji, 2021; Kozikoğlu & Altunova, 2018; Uysal Yalçın et al., 2019).

It is clear that nurses should be trained as lifelong learners during their professional education and graduate as nurses possessing 21st century skills. The acquisition of these qualifications is merely possible with training programs structured in this direction. For this reason, education programs should identify students' lifelong learning and 21st century skills and be structured to meet their requirements for these skills. The research is deemed significant in terms of shedding light on this need.

Purpose and Importance of the Research

Nursing students who embrace lifelong learning and possess 21st century skills graduate with different knowledge and skills and increase the quality of care by providing more qualified care. Therefore, determining lifelong learning attitudes and 21st century skills of nursing students is important for nursing education. The research was conducted in order to determine nursing students' lifelong learning attitudes and their 21st century skills and the relationship between them. The research sought answers to the following questions:

- What are the lifelong learning attitudes of nursing students?

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- What are the 21st century skills of nursing students?
- Is there a difference between nursing students' lifelong learning attitudes and their 21st century skills according to their socio-demographic characteristics?
- How is the relationship between nursing students' lifelong learning attitudes, and 21st century skills?

Materials and Methods

This is a descriptive, and relation-seeking type of research. The population of the research consisted of 453 students studying in the nursing department of a university. The sample was determined as a minimum of 209 students with an effect size of 0.05, 5% error level and 95% confidence interval, using the sample population known. Considering the possibility of data loss, the study was conducted with 338 students studying in the nursing department, who agreed to participate in the research and were selected by random sampling method.

Registered to the department of nursing at the age of 18 and over and accepted to participate in the research 1., 2., 3. and 4. nursing students are included in the class. Students who are under the age of 18, who are not registered in the department of nursing and who do not agree to participate in the study were excluded from the study.

The data within the scope of the research were collected with the “Information Form”, “Lifelong Learning Attitude Scale (LILAS) for Healthcare Students in Higher Education” and “Multidimensional 21st Century Skills Scale”.

Data Collection Tools

The information form was developed by the researchers in line with the literature (Erdoğan, 2020; Peker, 2019) and consisted of 15 questions to determine the socio-demographic characteristics of nursing students (age, gender, marital status, education level, reason for, choosing the nursing profession, career plan after graduation, reading habits, use of information and communication technologies, participation in social responsibility projects, and social activities, participation in vocational seminars, courses, certificate programs)

Lifelong Learning Attitude Scale (LILAS) for Healthcare Students in Higher Education developed by Karaca et al. (2021) is a 6-point Likert-type scale consisting of 23 questions. Response options are listed as 1: Strongly disagree 6: Strongly agree. The scale consists of five sub-dimensions which are Desire for Vocational Learning (DVL) (6 items), Valuing Continuing Professional Development (VCPD) (8 items), Utilizing Face-to-Face Learning Opportunities (UFLO) (3 items), Using Mobile Devices (UMD) (3 items), and Self-Assessment

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(SA) (3 items). Regarding the lifelong learning attitude, the lowest possible score is 23 points and the highest is 138 points. As the score increases, the attitude increases positively as well. The Cronbach alpha (α) internal consistency coefficient of the scale is 0,91. In our research, on the other hand, the Cronbach alpha (α) internal consistency coefficient of the scale was found to be 0,95.

Multidimensional 21st Century Skills Scale was developed by Cevik and Senturk (2019) for students in the 15-25 age group. The scale is a 5-point Likert-type scale consisting of 41 questions. Response options are listed as 1: Totally agree to 5: Totally disagree. The scale consists of five sub-dimensions which are Information and Technology Literacy Skills (ITLS) (15 items), Critical thinking and problem solving Skills (CTPSS) (6 items), Entrepreneurship and Innovation Skills (EIS) (10 items), Social Responsibility and Leadership Skills (SRLS) (4 items), and Career Awareness (CA) (6 items). Items 16, 17, 18, 19, 20, 21, and 35 are reverse coded in the scale. The lowest score is 41 in the scale, and the highest score is 205, and the increase in the scores indicates that the multidimensional 21st century skills increase positively, while the decrease in the scores indicates that these skills decrease. The Cronbach alpha (α) internal consistency coefficient of the scale is 0,86. In our research, on the other hand, the Cronbach alpha (α) internal consistency coefficient of the scale was found to be 0,90.

Data Collection

Data in the research were collected online between 04.01.2021 and 30.04.2021. Before participating in the research, the participants were interviewed online, information was given about the research, their consent was obtained, and the research was conducted with the participants who volunteered to participate herein.

The data collection process was collected online via the Google Form (https://forms .gle/C6u1ygK1XhCiSYnn6). The Google Form has the limit the survey to one answer feature in the settings section, and with this feature, each student is allowed to provide an answer. In addition, it took about 7-10 minutes to fill out the form. After the targeted sample number has been reached, the form has been closed for use.

Statistical Analysis

Obtained data were analysed by using descriptive statistical methods (mean, standard deviation, frequency, and percentage distributions) and Kolmogrov-smirnov test, which is a test of normality, by means of IBM SPSS 25 program, and T test and analysis of variance tests were conducted to examine the learning dimensions based on the characteristics of the participants. Sidak pairwise comparison test was applied to examine the dimensions found to be different as

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a result of variance analysis. Cronbach's Alpha coefficient was used to evaluate the reliability of the scales. Correlation, and regression analysis were applied to reveal the relationship between the scales. Regression analysis was performed in order to model the relationship between dimensions, and to show them as multiple forms. In the regression analysis, R2, Durbin Watson test, Model, and coefficient significance were examined. In the analyses, the significance level was taken as $p<0,05$ at 95% confidence level.

Ethics Approval

An ethics committee approval, dated 29.12.2020 and numbered 2020.260.12.05, was received from the Non-Interventional Ethics Committee and the institution where the research would be conducted. Besides, a written informed consent was obtained from the students.

Results

Of the students participating in the research, 77,5% are women, 68,6% are over the age of 20, 31,4% are first-grade nursing students. Additionally, 87,6% of the students like to read books, 52,4% participate in social responsibility projects, and 80,8% participate courses related to their profession (Table 1).

Table 1. Sociodemographic and educational characteristic of nursing students (N=338)

Sociodemographic		**n**	**%**
Gender	Male	79	22,5
	Female	**272**	**77,5**
Age	< 20 years old	**190**	**54,1**
	≥ 20 years old	161	45,9
Type of high school graduated	Anatolian High School	**241**	**68,7**
	High School	31	8,8
	Science High School	14	4,0
	Health vocational high school	61	17,4
	Technical high school	4	1,1
Grade	1 st	**109**	**31,1**
	2 nd	106	30,2
	3 rd	74	21,1
	4 th	62	17,7
Marital status	Single	**338**	**96,3**
	Married	13	3,7
Reason for choosing the nursing profession	Will of family	23	6,6
	For helping people	54	15,4
	Higher job opportunities	**127**	**36,2**
	Willingly	103	29,3
	Liking the profession	42	12,0
	To go to university	2	0,6

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Career plan after graduation	Be educators	30	8,5
	Work in the public sector	**176**	**50,1**
	Receive postgraduate education	121	34,5
	Work in the private sector	8	2,3
	Be in Managerial Positions	16	4,6
Reading habits	Yes	**308**	**87,7**
	No	43	12,3
Participation in social responsibility projects	Yes	**186**	**53,0**
	No	165	47,0
Participation in vocational courses	Yes	**281**	**80,1**
	No	70	19,9

The average LILAS total score was 121,66 (*SD:* 14,75), whereas the average score was 44,79 (*SD:* 5,12) for the valuing continuing professional development subscale, 31,68 (*SD:* 4,83) for the desire for vocational learning subscale, 14,70 (*SD:*3,30) for the utilizing face-to-face learning opportunities subscale, 14,51 (*SD:*3,07) for the using mobile devices subscale, 15,99, (*SD:*2,53) for the self-assessment subscale. The mean of all sub-dimensions was close to the upper limit, and the largest standard deviation in sub-dimensions was found in valuing continuing professional development (*SD:* 5,12), and desire for vocational learning (*SD:* 4,83). The average Multidimensional 21st Century scale total score was 94,80 (*SD:*16,72), whereas the average score was 26,86 (*SD:* 7,63) for the information and technology literacy skills subscale, 23,38 (*SD:* 7,11) for the entrepreneurship and innovation skills subscale, 8,86 (*SD*: 3,37) for the career awareness subscale. However, the critical thinking and problem solving skills sub-dimension was found to be high with a value of 25,11 (*SD:* 4,91) (Table 2).

Table 2. Nursing students' lifelong learning attitudes and 21st century skills score means, standard deviation and min-max values (N=338)

Dimensions	**X±SD**	**Score range that can be taken Min-Max**	**Received score range Min-Max**
LILAS	121,66±14,75	23-138	32-138
DVL	44,79±5,12	8-48	9-48
VCPD	31,68±4,83	6-36	8-36
UFLO	14,70±3,30	3-18	3-18
UMD	14,51±3,07	3-18	3-18
SA	15,99±2,53	3-18	3-18
Multidimensional 21st century skills scale	94,80±16,72	41-205	41-164
ITLS	26,86±7,63	15-75	15-60
CTPSS	25,11±4,91	6-30	6-30
EIS	23,38±7,11	10-50	10-50
SRLS	10,58±2,56	4-20	4-20
CA	8,86±3,37	6-30	6-30

X: Mean SD: Standard deviation. Min-Max: Minimum-Maximum

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Table 3. Lifelong learning attitudes and 21st century skills of nursing students according to socio-demographic characteristics (N= 338)

		Multidimensional 21st century skills scale						**LILAS**					
		ITLS	**CTPSS**	**EIS**	**SRLS**	**CA**	**21st century skills**	**DVL**	**VCPD**	**UFLO**	**UMD**	**CA**	**The lifelong learning attitudes**
		X±SD	X±SD	X± SD	X± SD	X± SD	X± SD	X± SD	X± SD	X± SD	X± SD	X± SD	X± SD
High School	Anatolian high school	26,93±7,37	22,39±2,69	39,44±6,77	9,67±3,17	13,48±4,62	111,9±14,7	2,90±0,47	2,92±0,47	2,96±0,48	2,98±0,49	3,03±0,51	5,25±0,65
	High school	28,72±7,58	22,31±3,27	36,21±8,58	9,00±2,65	12,21±3,99	108,45±15,46	2,75±0,49	2,76±0,48	2,76±0,49	2,76±0,5	2,79±0,54	5,29±0,75
	Science high school	24,23±5,37	23,46±1,13	41,76±3,74	11,38±2,9	14,38±5,35	115,22±10,09	2,99±0,26	3,09±0,27	3,15±0,29	3,21±0,3	3,29±0,36	5,54±0,51
	Health vocational high school	25,93±9,02	22,81±2,05	37,77±7,98	9,14±3,15	13,86±4,22	109,52±16,11	2,77±0,51	2,80±0,52	2,82±0,53	2,84±0,53	2,91±0,57	5,43±0,46
	Technical high school	31,75±3,59	20,00±2,83	40,00±7,28	8,5±2,65	17,25±9,29	117,5±9,56	2,47±0,13	2,53±0,24	2,56±0,26	2,58±0,32	2,49±0,46	4,55±1,46
	p	**0,01***	**0,04***	**0,01***	**0,01***	**0,01***	**0,01***	**0,01***	**0,01***	**0,03***	**0,02***	**0,02***	**0,04***
Career plan after graduation	Be educators	25,07±7,6	24,17±1,56	39,57±7,06	8,97±3,19	12,7±4,29	109,47±15,04	2,77±0,46	2,79±0,48	2,82±0,51	2,83±0,51	2,93±0,52	5,55±0,35
	Work in the public sector	27,61±6,84	23,10±2,95	38,76±7,03	9,74±3,01	14,11±4,39	112,32±14,82	2,89±0,48	2,92±0,48	2,96±0,49	2,98±0,5	3,03±0,52	5,21±0,65
	Receive postgraduate education	26,38±8,53	22,84±2,25	39,2±6,89	9,5±3,27	12,75±4,65	110,66±14,46	2,88±0,43	2,89±0,43	2,92±0,45	2,92±0,46	2,97±0,5	5,39±0,57
	Work in the private sector	25,14±4,26	24,00±2,35	35,31±11,69	8,57±3,10	11,86±2,79	104,88±19,13	2,65±0,75	2,62±0,74	2,83±0,74	2,85±0,74	2,68±0,75	5,76±0,18
	Be in managerial position	26,71±9,72	20,64±2,95	40,0±8,50	10,86±3,37	15,5±6,69	113,71±16,21	2,95±0,51	3,00±0,54	3,06±0,57	3,08±0,57	3,14±0,63	4,67±1,02
	p	0,03*	0,04*	0,04*	0,04*	0,01*	0,04*	0,04*	0,03*	0,02*	0,02*	0,01*	0,01*
Participation in vocational courses	Yes	26,37±7,14	22,66±2,36	38,87±7,29	9,42±3,05	13,15±4,38	110,47±14,49	3,15±0,47	3,17±0,48	3,16±0,49	3,26±0,48	3,17±0,52	5,40±0,55
	No	28,94±9,2	21,71±3,41	39,36±6,54	10,2±3,4	15,03±5,22	115,24±15,77	2,87±0,45	2,89±0,45	2,84±0,46	2,27±2,24	2,82±0,5	4,81±0,78
	p	0,14	0,19	0,36	0,12	**0,03***	**0,04***	0,13	0,19	0,01	**0,01***	**0,04***	**0,01***

*p<0,05 X: Mean SD: Standard deviation

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There was no significant difference between the mean scores of LILAS sub-dimensions of nursing students based on gender, age, grade, reading habits, and the reason for choosing the profession (p>0,05). The significant difference was found between LILAS sub-dimensions based on the high school that the nursing students completed (p<0,05). The mean scores of all sub-dimensions of LILAS of science high school and Anatolian high school graduates were higher than other students. The significant difference was found between the postgraduate career plans of nursing students and their mean scores of LILAS sub-dimensions (p<0,05). Those who want to be in managerial positions after graduation, and those who are willing to work as nurses in the public sector have higher LILAS sub-dimensions score averages than other students. It was also determined that those who want to be educators, receive postgraduate education, and work in the private sector have the highest LILAS score average while those who want to be in managerial positions have the lowest scores. The significant difference was found between the nursing students' participation in vocational courses, and the mean scores of the LILAS sub-dimensions (p<0,05). The using mobile devices and self-assessment sub-dimensions scores of the nursing students who participated in the vocational courses were higher than the other students. At the same time, the LILAS scores of the students participating in the vocational courses were also higher than the other students (Table 3).

There was no significant difference between the gender, age, grade, reading habits of nursing students and their multidimensional 21st century skills average scores (p>0,05). The significant difference was found between the high school that nursing students completed, and their 21st century skills (p<0,05). Critical thinking and problem solving skills, social responsibility, and leadership skills scores of science high school, and Anatolian high school graduates were found to be higher than other students. The significant difference was found between the “post-graduation career plans” of nursing students, and their mean scores of Multidimensional 21st century skills scale (p<0,05). Those who want to be in managerial positions after graduation, and who are willing to work as nurses in the public sector had higher scores on sub-dimensions information and technology literacy skills, social responsibility, and leadership skills, and career awareness when compared to other students. It has been determined that the multidimensional 21st century skill scores of nursing students who are willing to receive postgraduate education, want to be in a managerial position and work as a nurse in the public sector are higher. The significant difference was found between the mean scores of multidimensional 21st century skills according to the participation of nursing students in vocational courses (p<0,05). It has been observed that the career awareness score and

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Multidimensional 21st century skill scores of the students who do not participate vocational education, and courses are at higher levels (Table 3).

Table 4. Correlation and relationship between 21st century skills and lifelong learning attitudes (N=338)

Dimensions	Test value	LILAS
ITLS	r	**-0,34***
	p	and0,01
CTPSS	r	**0,78***
	p	0,01
EIS	r	-0,03
	p	0,59
SRLS	r	**-0,23***
	p	0,01
CA	r	**-0,32***
	p	0,01
Multidimensional 21st century skills scale	r	-0,09
	p	0,10

*p<0,05 (t and p test value)

There was a significant multidimensional relationship between nursing students' LILAS and the sub-dimensions of Multidimensional 21st Century Skills Scale namely critical thinking and problem solving skills, career awareness, and information and technology literacy skills. The model between the LILAS, and the sub-dimensions of critical thinking and problem solving skills, career awareness, and information and technology literacy skills was found to be significant (F=215,93, p=0,01, p<0,05). It was seen that the percentage of explanation of the model was 66% ($R2$=0,66), and this rate was high. The critical thinking and problem solving skills, career awareness, and information and technology literacy skills sub-dimension coefficients were also found to be significant (p=0,01, p<0,05). According to the results of the Durbin Watson ($D.W$ 1,99) test performed to examine the presence of an autocorrelation in the model, it was observed that there was no autocorrelation. According to the results, LLL attitudes is positively affected by the level of critical thinking and problem solving skills. A single-unit increase in critical thinking and problem solving skills increases the LLL level by 0,74 units, while a single-unit increase in career awareness, and information and technology literacy skills decreases the LLL level by 0,19, and 0,08 units, respectively (Table 4, Table 5).

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Table 5. The effect of multidimensional 21st century skills scale on lifelong learning attitude of medical and health sciences students scale

Dependent variable	**Independent variables**			**F Model**	**R^2**
	CTPSS* (β)	CA* (β)	ITLS* (β)		
LILAS	0,74 t=22,57, **p=0,01**	-0,19 t=-4,95, **p=0,01**	-0,08 t=-2,15, **p=0,03**	F=215,93 (p=0,01)	0,66

* Regression analysis ** D.W;1,9, t: T ***p<0,05

Discussion and Conclusion

This research examined in order to determine nursing students' LLL attitudes and their 21st century skills and the relationship between them.

According to the research, the average scores of nursing students regarding valuing continuing professional development, desire for vocational learning, utilizing face-to-face learning opportunities, using mobile devices, and self-assessment are high; the standard deviation values of the attitudes of valuing continuing professional development, and desire for vocational learning are high in all sub-dimensions. Herdman (2007) stated that qualified nursing services are merely possible with professional development, professional learning, LLL, and continuous education. The findings of this research are in line with the literature in this respect and were considered as positive. In this research, it was seen that nursing students had the highest average score in the critical thinking and problem solving skills sub-dimension of the Multidimensional 21st century skills scale. Engin & Korucuk (2021), in their research with university students, concluded that students' critical thinking and problem solving skills were high. This research is similar to the literature in this respect as the high level of critical thinking and problem solving skills skills of nursing students. In this research, entrepreneurship and innovation skills, and career awareness of nursing students were found to be low. Engin & Korucuk (2021) concluded that university students had higher entrepreneurship and innovation skills, and career awareness. This research differs from the literature in this respect. This result suggested that nursing students' entrepreneurship and innovation skills, and career awareness should be developed.

There was no significant difference between the gender, age, grade, and LILAS sub-dimensions of nursing students. Similarly, Kangalgil & Özgül (2018) did not find a significant difference in the LLL tendencies of university students according to their genders and age groups. Küpana & Sazak (2019) concluded in their research that students' LLL competencies

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do not differ significantly according to gender and grade variables. Although there are similar results to those of this research in the literature, no consistent results were found in studies of LLL attitudes based on gender. This result has suggested that there is a need to examine the subject with qualitative studies. In this research, no significant difference was found between reading habits of nursing students and their LLL attitudes. This result suggested that there is a need to improve the reading habits of nursing students. This research showed that graduates of Science High Schools and Anatolian High Schools had significantly higher LLL attitudes than those who graduated from other high school programs. This result demonstrates that science high school and Anatolian high school programs support LLL.

This research determined that the LLL attitudes of the students who want to be an educator after graduation, who aspire to work in the private sector, and who want to receive postgraduate education are higher than those who are willing to serve in managerial positions. Similarly, Klavuz & Karabağ Aydın (2020) concluded that nursing students who want to be educators, and who want to receive postgraduate education have higher LLL tendencies. Similarly, Şahan & Yasa (2017) found that students who receive postgraduate education have a higher sense of curiosity towards professional development, and learning, and concluded that this improves students academically. Klavuz & Karabağ Aydın (2020) found a significant difference in LLL tendencies of nursing students who want to be educators. The results revealed that students who want to be educators, and who want to receive postgraduate education are open to learning, value professional development, and adopt LLL. It was concluded that those who want to be in managerial positions had higher scores than the other students within the sub-dimension all scores of LILAS scale. It is important for nurses to adapt to constantly developing scientific innovations and technology in order to gain professional competence, and to be effective in all levels of nursing services (Karahan & Kav, 2018). The findings of this research are in line with the literature in this respect and were considered as positive.

In this research, it was concluded that the LLL attitudes of the students who participated in vocational courses were higher than other students. Similarly, Şahin et al. (2020) in their research with pre-service teachers concluded that the LLL tendencies of the students who participate vocational courses were high. Activities such as attending vocational courses contribute to the personal development of individuals and support their LLL. The result of the research is positive.

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There was no significant difference was found between the gender, age, grade, and reading habits, and 21st century skills, and its sub-dimensions in nursing students (p>0.05). Erdoğan (2020) found that students' 21st century skills do not differ according to their gender, grade level, and reading habits. This finding is similar to the literature in this respect. In this research, the critical thinking and problem solving skills, and social responsibility, and leadership skills of Science High School, and Anatolian High School graduates were found to be higher than other students. Peker (2019) stated in his dissertation that the 21st century skills of teacher candidates do not differ significantly according to the high schools they graduated from. This finding differs from the literature in this respect. It has been determined that the 21st century skills of nursing students who want to receive postgraduate education were higher. Kozikoğlu & Altınova (2018) did not find a significant difference in the self-sufficiency perceptions of students who want to receive postgraduate education. This finding differs from the literature in this respect. It has been reported in the literature that a nurse who is a manager should have leadership qualities and develop these qualities in order to be successful (Ardahan & Konal, 2017; Van Diggele et al., 2020). This research shows that those who want to be managers have higher social responsibility, and leadership skills than other students. This finding is in line with the literature and was considered a positive result.

This research showed that nursing students who did not participate vocational courses had higher 21st century skills and career awareness. Therefore, restructuring out-of-school training activities in a way that will attract students' attention, and be student-oriented will help them gain 21st century skills in a more effective manner (Karataş & Zeybek, 2020).

According to the data obtained in this research, which was conducted to examine the relationship between nursing students' LLL tendencies and 21st century skills; it was found that there was no significant relationship between nursing students' general levels of the 21st Century Skills Scale and their LLL attitudes. Within the scope of the research, it was observed that there was a weak, inverse, and significant relationship between nursing students' LLL attitudes, and information and technology literacy skills, social responsibility, and leadership skills, and career awareness while there was a very strong, directly proportional and significant relationship between their critical thinking and problem solving skills. Erdogan (2020) found a positive, significant, and moderate relationship between Turkish teacher candidates' 21st century skills and LLL tendencies in his research with pre-service teachers Geçgel et al. (2020) found a moderately negative relationship between critical thinking and problem solving skills,

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and career awareness.The results of this research showed that nursing career awareness, technology literacy, and social responsibility, and leadership skills, and should be developed .

Within the scope of the research, it was seen that there is a very strong, directly proportional, and significant relationship between critical thinking and problem solving skills. Partnership for 21st Century Learning (2019) revealed that critical thinking and problem solving play an important role in LLL. Critical thinking is effective in increasing professional competence as well as improving the ability to make the right decision . Nursing students need improvement of their critical thinking skills in order to investigate the scientific facts and determine the needs of their patients, to evaluate complex information about patients from different perspectives, and to implement evidence-based nursing practices (Kaya et al., 2018). In order to possess critical thinking skills in nursing education, it is necessary to be aware of a problem and gain the ability to solve it (Özkahraman & Yıldırım, 2011). In this respect, nursing students need to acquire problem-solving skills in order to have critical thinking. critical thinking and problem solving skills, which are among the basic skills of the 21st century, are possible with LLL. Among the primary responsibilities of educational institutions is to raise individuals who can think critically, make effective decisions in the face of problems and have LLL skills (İlaslan et al., 2023; Şahin et al., 2014). Nursing students need to develop their LLL skills in order to have up-to-date academic knowledge, and improve their intellectual levels after graduation (Şenyuva & Kaya, 2014). This research showed that there is a very strong, directly proportional, and significant relationship between LLL attitudes, and critical thinking and problem solving skills, and in this respect, it is in line with the literature. This result showed that as the LLL attitudes of the students increased positively, their critical thinking and problem solving skills also improved. Developing students' LLL attitudes will contribute to the development of their critical thinking and problem solving skills.

The results obtained from the research showed that nursing students who participate vocational courses, willing to receive postgraduate education, and want to be educators afterwards have LLL skills, while those who want to be in managerial positions have 21st century skills.

The research shows that the most important variable affecting the LLL attitudes of nursing students is critical thinking and problem solving skills, which are sub-dimensions of 21st century skills. Nursing students' LLL attitudes are strongly, and positively affected by their critical thinking and problem solving skills while their career awareness, and information and

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technology literacy skills are negatively affected. However, the average of critical thinking and problem solving skills of nursing students was found to be high.

In line with the results; it can be suggested that LLL attitudes and 21st century skills studies should be added to the curriculums during university and postgraduate education. At the same time, it can be suggested that the research be applied to large sample groups in different departments in different universities.

Limitations

Since the research is collected online, it is limited to nursing students who actively use these environments, agree to participate in the research voluntarily, and study only in the 2020-2021 academic year, and therefore cannot be generalized to all nursing students. Another limitation is that the data collected on lifelong learning attitudes and 21st century skills are limited to students' self-assessments.

Financial Support

No financial support was provided for the research.

Conflict of Interest

The authors declare that they have no conflict of interest.

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