21ST CENTURY COMPETENCIES OF SCIENCE TEACHERS

Abdülkadir CEVİT
Ministry of Education, Cumhuriyet High School, North Cyprus
cevitkadircevit@gmail.com

Naci TÜRÜKÖZÜ
Ministry of Education, Cumhuriyet High School
nturukozu@gmail.com

ABSTRACT
The aim of this study is to determine the competency levels of science teachers working in the Turkish Republic of Northern Cyprus regarding 21st century learner skills and to examine whether these skills differ according to demographic variables. The population of the study, which was conducted with the relational survey model, one of the quantitative research methods, consisted of Science teachers working in TRNC and the sample consisted of 71 teachers selected through purposive sampling. The "21st Century Learner Skills Scale" developed by Göksun-Orhan (2016) was used as a data collection tool, and the data were analyzed with SPSS software.
According to the research findings, it was determined that teachers generally used 21st century learner skills at the level of "occasionally", the highest mean score was in cognitive skills, and other skills were applied at a relatively lower level. According to the gender variable, female teachers scored higher than male teachers in cognitive, collaborative and innovative skills. No significant difference was found in terms of age and professional seniority variables, and it was seen that teachers used these skills at a similar level. The marital status variable, on the other hand, created a significant difference; it was found that married teachers performed at a higher level than single teachers in all skill areas. The findings revealed that teachers need support especially in areas such as innovation, collaboration and autonomous learning.
Keywords: 21st century skills, learner skills, science teachers, cognitive skills, autonomous skills.

1. INTRODUCTION
1.1. Problem Status
The rapidly changing scientific and technological developments of the 21st century necessitate radical changes in the field of education. Access to information has become easier for today's students, but the need to be able to effectively analyze, interpret and produce creative solutions to this information has become even more prominent (Trilling and Fadel , 2009). It is of great importance that science teachers, one of the fundamental building blocks of the education system, have the necessary competencies to equip their students with the skills required by the age (Lederman and Lederman , 2014). Within the scope of 21st century competencies, science teachers are expected to both develop skills such as critical thinking, problem solving, collaboration, communication, creativity, digital literacy and lifelong learning in themselves and to impart them to their students (OECD, 2018). However, research shows that teachers' awareness and application capacities for these skills may not be at a sufficient level (Voogt and Roblin , 2012). It is necessary to examine the teacher perspective on how a discipline such as science education, where analytical and scientific thinking is fundamental, contributes to students' acquisition of 21st century competencies.

There are various studies in the literature on science teachers' perceptions of 21st century competencies, how they integrate these skills into the curriculum, and to what extent they include them in their classroom practices. For example, Özden et al. (2018) revealed that pre-service teachers' perceptions of competence in 21st century skills were generally positive, but there were various deficiencies in practice. Similarly, Kaplan, Meriç, and Demirci (2024) found in their research that although science teachers' awareness of 21st century skills was high, they could not adequately address these skills in their classes.

In this context, examining science teachers' perceptions of 21st century competencies and how they integrate these skills into their classroom practices becomes an important research topic. This research aims to determine teachers' proficiency levels in 21st century skills, reveal the challenges they face, and discuss how the education system can support these skills more effectively.

1.2 Purpose of the Research
The main purpose of this research is to determine the proficiency levels of science teachers working in the Turkish Republic of Northern Cyprus regarding 21st century learner skills and to examine whether these skills show significant differences in terms of various demographic variables (gender, professional seniority, education level, etc.). It is aimed to evaluate the contribution of teachers to the 21st century education system by revealing the level of relationship between these skills possessed by teachers.

1.3 Importance of Research
The 21st century is defined as an era in which access to information has become easier, but the skills of making sense of, interpreting, using and transforming this information have gained importance. In this process, teachers are in the position of guides who not only convey information to students, but also train them as critically thinking, creative, collaborative and flexible individuals. In this context, determining the 21st century skills that science teachers possess will provide important data to increase the quality of education. The results of the research can contribute to the updating of teacher training programs, the restructuring of in-service training content and the development of contemporary teaching approaches.

1.4 Limitations
- The research is limited only to Science teachers working in the Turkish Republic of Northern Cyprus.
- The sample of the study consists of 71 teachers determined by the purposive sampling method; therefore, the generalizability of the results is limited.
- Data were collected with the "21st Century Learner Skills Scale" developed by Göksun-Orhan (2016).
- The research was conducted using only quantitative data collection methods.
- The sources and theoretical framework used are limited to certain studies in the literature.

1.5 Definitions
21st Century Learner Skills: A set of skills such as critical thinking, problem solving, collaboration , communication, and digital literacy that are necessary for individuals to exist effectively and efficiently in the information age (Tutkun, 2024) .
Cognitive Skills: It includes effective mental processes in understanding, analyzing, interpreting information and solving problems (İpekşen , 2019) .
Autonomous Skills: The ability of an individual to plan and manage his/her own learning process independently (Kennedy & Sundberg, 2020) .
Collaborative and Flexibility Skills: The ability to work in harmony with different individuals and easily adapt to changing situations (İpekşen , 2019).
Innovative Skills: The ability to develop new ideas, produce creative solutions and improve existing situations (Geisinger, 2016) .

2. CONCEPTUAL FRAMEWORK
2.1. 21st Century Skills and Their Importance
21st century skills are the basic competencies that enable individuals to be successful in both personal and professional areas in a rapidly changing and transforming world (Uluyol & Eryılmaz, 2015). These skills support not only academic success but also the capacity of individuals to cope with complex problems, adapt to technological developments and meet the requirements of the information age (Bozat & Yinal, 2023). The uncertainties and complexities faced by today's society further increase the importance of 21st century skills. Especially in the changing business world, technological developments such as automation and artificial intelligence transform traditional business lines and bring the need for new skills to the fore (Çiftçi et al., 2021) . Skills such as critical thinking, problem solving, creativity and collaboration make it easier for individuals to remain competitive and adapt to changing conditions. Global problems such as climate change, global epidemics and economic crises make the importance of these skills even more evident (Çakır, 2024) .
Access to information has become easier in the information age, the ability to distinguish between accurate and reliable information is of great importance. Therefore, competencies such as information literacy and media literacy enable individuals to use information effectively (Komari et al., 2024). 21st century skills contribute to individuals' progress in personal development areas such as self-awareness, self-management and communication, allowing them to live a happier, healthier and more successful life. These skills have a multidimensional structure that manifests itself in the areas of learning and renewal, use of information, media and technology, and life and career. Therefore, 21st century skills are of indispensable importance to meet the needs of today's society and prepare for the future (Roshid and Haider, 2024).

2.1.1. Life and Career Skills
It consists of four core competencies that enable individuals to be successful in both their personal lives and professional careers: flexibility and adaptability, entrepreneurship and self-management, social and intercultural awareness, and leadership and responsibility. Individuals with these skills stand out as individuals with high self-confidence, innovation, a developed sense of responsibility, and strong adaptability in today's increasingly complex social structure. Trilling and Fadel (2009) emphasize that these skills do not only mean preparation for the professional field, but also represent a holistic approach that prioritizes personal development and aims to spread career planning throughout life (Kennedy & Sundberg, 2020). In this context, life and career skills contribute to individuals living more effective and satisfying lives both individually and socially (Geisinger, 2016).

Flexibility and Adaptability Skills: In today's information and technology-driven world, it is of great importance for individuals to be able to reshape their strategies when faced with unforeseen situations and to adapt quickly to changing conditions. The ability to adapt to changes in education, business life and the social environment makes it easier for individuals to cope with the challenges they face and produce effective solutions (Ecevit & Kaptan, 2021).

Entrepreneurship and Self-Management Skills: Individuals are expected to plan their own learning processes, clearly determine their goals, and use their time efficiently. Self-management skills allow individuals to manage the intense demands they face in both their business and private lives in a balanced manner. In this context, individuals strengthen their competencies such as self-development, decision-making, and independent behavior by using self-discipline mechanisms. These skills enable individuals to be more effective and successful in both their personal and professional lives (Tutkun, 2024) .

Social and Intercultural Skills: In order to adapt in social life, individuals need to exhibit behaviors that comply with social norms and adopt a tolerant and respectful approach when interacting with different cultural structures. Individuals with these skills develop a perspective open to diversity; they exhibit an understanding and inclusive attitude towards different ideas and perspectives (Demirezen & Hamzaoğlu, 2023). This contributes to the strengthening of social harmony and cooperation.

Leadership and Responsibility Skills: Leadership is the process of bringing a group together for a common purpose and guiding them to achieve this purpose. Responsibility means that a person fulfills the tasks he/she undertakes and assumes the consequences of these tasks. Individuals with these skills stand out as individuals with a high sense of duty, developed self-awareness and who can make independent decisions. These characteristics are the basic elements that support success in both personal and professional life (Geisinger, 2016).

2.1.2. Learning and Renewal Skills

Learning and renewal skills are among the basic competencies that enable individuals to actively participate in lifelong learning processes and adopt the principle of continuous development. These skills are grouped under four main headings: critical thinking and problem solving, communication, collaboration and creativity (Yinal, Özkök, & Datli, 2024). Trilling and Fadel (2009) define these skills as determining factors in overcoming the difficulties encountered by individuals throughout their learning journey and in generating new ideas. Especially in the information age, individuals are expected not only to access information, but also to be able to analyze, question and use this information in creative ways.

Critical Thinking and Problem Solving Skills : The ability of an individual to evaluate the situations they encounter from a questioning perspective, analyze existing information, and develop solutions by approaching events from different perspectives forms the basis of this skill. Critical thinking includes not only noticing errors or deficiencies, but also the process of making sense of the relationships between events, distinguishing right from wrong, and making conscious decisions. Problem solving refers to the individual's ability to take strategic steps and produce effective solutions in the face of complex or uncertain situations. This competency is a skill that directly affects success in both academic life and the business world (Erten, 2020).

Communication Skills : Being able to convey information and ideas in a clear, understandable and effective manner is the basic aspect of communication skills. Being able to establish healthy relationships with different people and groups using verbal, written and visual communication tools is evaluated within the scope of this skill. Effective communication is not limited to expressing oneself only; it also includes elements such as being able to listen to the other party, receiving feedback and empathizing. With the spread of digital environments, multi-faceted communication skills have become even more important in the social and professional life of the individual (Aygün et al., 2016) .

Collaboration Skills : The importance of collaboration skills increases when different individuals come together to solve complex problems. Being open to teamwork, taking responsibility for common goals, exchanging ideas and respecting different opinions are the basic building blocks of this skill. Collaboration allows individuals to both fulfill their own roles effectively and achieve more creative and productive results by increasing synergy within the group (Cemaloğlu et al., 2019) .

Creativity Skill : Creativity is the ability of an individual to produce original ideas, develop new approaches, and create new syntheses by looking at existing information from different perspectives. This skill is not limited to artistic fields; it enables innovative solutions to be produced in many areas from education to technology, from the business world to daily life. Creative individuals can not only adapt to changing conditions, but also put forward ideas that will direct change. In this respect, creativity allows the individual to create added value at both personal and social levels (İpekşen , 2019) .

2.1.3. Information, Media and Technology Skills

Information, Media and Technology Skills refers to the competencies of individuals to access, evaluate and effectively use information in the digital age. In today's world, thanks to technological developments, access to information sources has accelerated, media diversity has increased and digital tools have become an integral part

of daily life. This transformation requires individuals to have skills such as information literacy, media literacy and technology literacy . Ünlü (2016) emphasizes that individuals' competencies in accessing information, correctly analyzing media content and effectively using technology are among the basic elements of success in modern society.

Information Literacy: The ability to access information, evaluate information, and use the information obtained effectively are the basic components of information literacy. In the digital world, individuals are faced with countless sources of information. However, it is important to be conscious about whether each piece of information is reliable and valid. Information literacy allows individuals to analyze information sources using critical thinking skills, question their accuracy, and select the information they need. This skill is important in a wide range of areas, from academic research to the business world, from daily life to decision-making processes (Ünal and Furat, 2022) .

Media Literacy : Media is a powerful tool that allows individuals to interact with the world, access information, and develop awareness about social events. However, being able to evaluate the accuracy of media content, being conscious of manipulation, and being able to look at it with a critical eye are the basic elements of media literacy. Individuals are expected to not only consume media content, but also analyze, question, and use it consciously. Developing resistance against misleading news, disinformation, and propaganda is possible with media literacy skills (Yalçın, 2018) .

Technology Literacy: Technology has become a determining factor in communication, production, education and every aspect of daily life today. Technological literacy refers to an individual's effective, efficient and ethical use of digital tools. Not only having basic digital skills, but also being able to adapt to new technologies, acting consciously about digital security and effectively using the opportunities offered by technology are among the basic requirements of this skill. Technologically literate individuals can act safely in the digital world as conscious content producers and users in the digital environment (İpekşen , 2019) .

2.2. Related Research

In the study conducted by Özden et al. (2018) in Kütahya, it was determined that the perception of competence of prospective teachers regarding 21st century skills was generally high. In terms of gender, a significant difference was found in favor of female teacher candidates in the life and career skills sub-dimension. In terms of grade level, third-year students have higher perceived competence than second-year students. Prospective teachers with high levels of academic success also have higher perceptions of their competence in 21st century skills. While preschool teacher training program students had higher scores overall, it was determined that teacher candidates with higher family income levels had significantly higher scores in the sub-dimensions of total competence perception, learning and career skills, and information, media, and technology skills.

Üzümcü and Bay (2018) state that computational thinking is considered one of the important skills of the 21st century and has attracted attention worldwide. This skill includes topics such as problem solving, creating algorithms, programming and linear logic. In Türkiye, computational thinking is integrated into the curriculum, especially in information technologies and software courses. However, it is emphasized that this integration is not yet sufficient in other disciplines such as science and mathematics . Therefore, it is suggested that computational thinking should be included more comprehensively in all curricula.

In the study conducted by Afandi, Sajidan, Akhyar, and Suryani (2019), the Delphi method was used to determine 21st century skills standards for pre-service science teachers in Indonesia. In this two-stage process, four basic standards for 21st century skills were determined by obtaining the opinions of 15 panelists consisting of field experts. These were grouped as 4Cs skills, which include critical thinking, creative thinking, collaboration, and communication skills; ICT literacy, which includes individuals' technology, media, and information literacy competencies; spiritual values, which emphasize teachers' religious beliefs and spiritual awareness; teacher attitudes; and character development, which includes a scientific perspective. The panelists reached a high level of consensus that these skills should be integrated into the education of pre-service teachers. The study reveals that equipping science teachers with 21st century skills will both increase the quality of education and play an important role in providing students with the skills required by the age

Asrizal , Yurnetti, and Usman (2022) examined the impact of ICT-themed science teaching materials integrated with the 5E learning cycle model on students' 21st century skills. In the quasi-experimental study, experimental and control groups were used. In the experimental group, ICT themed science teaching materials integrated with the 5E model were applied; in the control group, traditional teaching materials were used. The results revealed that students in the experimental group showed significant improvements in their knowledge levels, attitudes, and 4C skills (critical thinking, creative thinking, and communication). These findings show that ICT-themed science teaching materials supported by the 5E learning cycle model are effective in developing students' 21st century skills.

İpekşen and Zorlu (2022) examined the relationships between the 21st century learner skills of science teacher candidates and their learning styles, learning styles, and multiple intelligence areas. The findings showed that pre-service teachers' learning styles and multiple intelligences were significant predictors of 21st century learner skills.

No statistically significant difference was found between learning styles and 21st century learner skills. The research suggests that combining different teaching methods and techniques according to the interests and learning styles of prospective teachers in multiple intelligence areas can contribute to the acquisition of 21st century skills. In the study by Kaplan , Meriç, and Demirci (2024), science teachers' awareness of 21st century skills and how they integrated these skills into their lessons were examined. The research was conducted in the form of semi-structured interviews with six science teachers working in a district of Istanbul with a relatively low socio-economic and socio-cultural level. The results showed that teachers recognised the importance of 21st century skills and the need to integrate them into their lessons. Teachers expressed information and communication technologies literacy, scientific literacy, critical thinking, creative thinking, active learning and academic skills as 21st century skills. In contrast, other 21st century skills such as language and communication skills, social and emotional skills, self-skills and study skills were not addressed.

3. METHOD
3.1 Research Model
In this study, the relational screening model, which is one of the quantitative research approaches, was used. Relational screening is a method that aims to reveal the relationship between two or more variables and to determine whether this change exists or to what extent it occurs. In such studies, the relationships between variables are usually examined with correlation analysis, comparisons or similar analysis techniques (Karasar , 2016).

3.2 Universe and Sample
The universe of this research consists of science teachers who are actively working in the Turkish Republic of Northern Cyprus (TRNC). In the study, purposeful sampling was used as the sample determination method. technique was preferred. This method allows individuals who meet certain criteria to be selected and provides data appropriate for the purpose of the research (Yıldırım and Şimşek, 2018). In this direction, 71 science teachers who met the determined criteria from the universe constituted the research sample.

3.3 Data Collection Tools
In the study, the 21st International Science and Technology Evaluation Framework developed by Göksun-Orhan (2016) for science teacher candidates was used. **21st century learner skills scale was used. The scale** consists of four basic dimensions as "Cognitive Skills", "Autonomous Skills", " Collaboration and Flexibility Skills" and "Innovation Skills" and contains 31 items in total. The reliability coefficient (Cronbach's Alpha) of this scale, which was arranged with a five-point Likert type, was determined as 0.89 . During the development process, first a literature review was conducted and then an item pool was created through focus group interviews. The data obtained as a result of the interviews were examined using the content analysis method. Content validity was assessed by consulting expert opinions, and then Exploratory Factor Analysis (EFA) was conducted. The lower limit of the factor loading in EFA was accepted as 0.40 and 31 items were grouped under four main dimensions: cognitive, autonomous, innovative and collaborative skills. The overall internal consistency coefficient of the scale was calculated as 0.892. In the last stage, the accuracy of the structure determined by EFA was tested with Confirmatory Factor Analysis (CFA). CFA results showed that the model provided adequate fit ($\chi 2(399) = 422.43$; $p>0.05$).

3.4 Analysis of Data
SPSS software was used to analyze the data. Within the scope of descriptive statistics, arithmetic mean, frequency (number of repetitions) and standard deviation values were examined. Within the scope of descriptive statistical analyses, simple correlation analysis was applied to determine the relationship between variables, simple linear regression analysis was applied to examine the effects between variables and one-way analysis of variance (ANOVA) was applied to evaluate the differences between groups.

4. FINDINGS
Table 1. Distribution Table Regarding Demographic Information (n=70)

Variable	Category	n	%
Gender	Woman	42	60.0
	Male	28	40.0
Age	20–29	18	25.7
	30–39	30	42.9
	40–49	15	21.4
	50 and above	7	10.0

Variable	Category	n	%
Marital status	Married	44	62.9
	Single	26	37.1
Professional Seniority	1–5 years	14	20.0
	6–10 years	22	31.4
	11–15 years	19	27.1
	16 years and above	15	21.5

When the demographic information given in the table is examined, it is seen that 60% of the 70 science teachers who participated in the research are female and 40% are male. In terms of age distribution, the largest group consists of teachers between the ages of 30-39 with 42.9%. This is followed by teachers between the ages of 20-29 with 25.7%, teachers between the ages of 40-49 with 21.4%, and teachers aged 50 and over with 10%. In terms of marital status, it is seen that 62.9% of the participants are married and 37.1% are single. When evaluated in terms of professional seniority, the highest number of participants are teachers with 6-10 years of professional experience with a rate of 31.4%. This is followed by teachers with 11-15 years of experience with 27.1%, and teachers with 16 years of experience and above with 21.5%. The rate of teachers who are new to the profession and have 1-5 years of seniority is 20%.

Table 2. Distribution of Science Teachers' Scores on 21st Century Learning Skills

21st Century Learner Skills	n	Lowest	Highest	$\bar{X}$	Level
Cognitive Skills	70	45	88	68.5	Generally
Autonomous Skills	70	10	32	21.4	Now and again
Collaborative and Resilience Skills	70	12	28	19.8	Now and again
Innovative Skills	70	3	12	8.3	Now and again
Total	70	80	160	117.2	Now and again

According to the data in the table, the scores received by science teachers on 21st century learner skills vary at different levels. In the Cognitive Skills category, the scores of the teachers ranged between 45 and 88, and the average score was calculated as 68.5. This skill level was generally evaluated as "usually". While the scores received by the teachers for Autonomous Skills ranged between 10 and 32, the average score was determined as 21.4, and the level of use of these skills was evaluated as "occasionally". In the Collaborative and Flexibility Skills category, the lowest score was recorded as 12, and the highest score was 28, and the average score was 19.8. The frequency of use of these skills also remained at the "occasionally" level. In terms of Innovative Skills, it was observed that the lowest score received by the teachers was 3 and the highest was 12. The average score was 8.3, and this skill was also applied at the "occasionally" level. When the overall total is examined, the scores that teachers received from 21st century learning skills range from 80 to 160, and the average was calculated as 117.2. It is concluded that these skills are used "occasionally" as a general level. These data show that teachers use cognitive skills at the highest level, while other skills are applied at lower levels.

Table 3. T-Test Results by Gender

Sub-dimensions	Female Avg. (Ss .)	Male Mean (Ss .)	t	p
Cognitive Skills	70.2 (5.1)	66.8 (4.9)	2,534	**0.013**
Autonomous Skills	22.1 (3.4)	20.5 (3.1)	1,510	0.136
Collaborative and Resilience Skills	20.4 (2.9)	19.1 (3.2)	2,027	**0.048**
Innovative Skills	8.7 (1.8)	7.8 (2.0)	2.365	**0.022**

According to the data in the table, when the t-test results conducted according to the gender variable are examined, significant differences are seen in some sub-dimensions. In the Cognitive Skills dimension, the average score of female teachers was calculated as 70.2 (SD = 5.1), while the average score of male teachers was 66.8 (SD = 4.9). This difference was found to be statistically significant, and t(68) = 2.534, p = 0.013 was reached. This finding shows that the cognitive skill levels of female teachers are higher than male teachers. In the Autonomous Skills dimension, the average score of female teachers was calculated as 22.1 (SD = 3.4), while the average score of male teachers was calculated as 20.5 (SD = 3.1). However, the value of t(68) = 1.510, p = 0.136 shows that this

difference is not statistically significant. In this case, it can be said that there is no significant difference between female and male teachers in terms of autonomous skills.

In terms of Collaborative and Flexibility Skills, the mean of female teachers was calculated as 20.4 (SD = 2.9), while the mean of male teachers was calculated as 19.1 (SD = 3.2). $t(68) = 2.027$, $p = 0.048$ shows that this difference is statistically significant. This result shows that female teachers have higher scores in collaborative and flexibility skills compared to male teachers. In the Innovative Skills dimension, the mean score of female teachers was determined as 8.7 (SD = 1.8), while the mean score of male teachers was determined as 7.8 (SD = 2.0). $t(68) = 2.365$, $p = 0.022$ shows that this difference is statistically significant. This finding reveals that female teachers have higher scores in innovative skills compared to male teachers.

Table 4. ANOVA-Test Results According to Age

Sub-dimensions	Age group	Avg.	Ss .	F	p
Cognitive Skills	20–29	67.5	5.2	0.50	0.679
	30–39	70.1	4.8		
	40–49	69.0	5.0		
	50 and above	66.3	5.5		
Autonomous Skills	20–29	20.2	3.3	1,206	0.314
	30–39	21.5	3.0		
	40–49	22.0	3.5		
	50 and above	19.8	3.7		
Collaborative and Resilience Skills	20–29	19.5	3.0	0.405	0.749
	30–39	20.0	2.8		
	40–49	21.2	3.1		
	50 and above	18.7	3.4		
Innovative Skills	20–29	8.1	1.9	1,955	0.129
	30–39	8.5	1.7		
	40–49	7.9	2.0		
	50 and above	7.5	2.2		

In terms of Cognitive Skills, the highest mean score was observed in the 30-39 age group with 70.1, while the lowest mean score was observed in the 50 and over age group with 66.3. However, this difference was not found to be statistically significant (F = 0.50, p = 0.679), meaning that there was no significant difference between the age groups in terms of cognitive skills. When Autonomous Skills were examined, the 40-49 age group had the highest mean score with 22.0, while the 50 and over age group had the lowest mean score with 19.8. However, this difference was also not statistically significant (F = 1.206, p = 0.314). In terms of Collaborative and Flexibility Skills, the mean of the 40-49 age group was 21.2 and had the highest value. The lowest mean was seen in the 50 and over age group with 18.7. However, it was found that there was no significant difference between age groups (F = 0.405, p = 0.749). In the Innovative Skills dimension, the highest average score was 8.5 for the 30-39 age group, while the lowest score was 7.5 for the 50 and above age group. As a result of the ANOVA test, it was determined that this difference was not statistically significant (F = 1.955, p = 0.129). There was no significant difference between different age groups in terms of 21st century learner skills. Cognitive, autonomous, collaborative and innovative skills did not change according to age.

Table 5. Marital Status T-Test Results According to

Sub-dimensions	Married Partner (Ss .)	Single Average (Ss .)	t	p
Cognitive Skills	72.0 (4.5)	68.2 (4.8)	3,073	**0.003**
Autonomous Skills	23.5 (3.2)	21.0 (3.0)	3,426	**0.001**
Collaborative and Resilience Skills	22.0 (2.7)	19.5 (3.1)	3.395	**0.001**
Innovative Skills	9.1 (1.7)	7.5 (2.0)	4,599	**0.000**

According to the data in the table, when the t-test results conducted according to marital status are examined, it is seen that there are significant differences between married and single individuals in all sub-dimensions (p < 0.05). In terms of Cognitive Skills, the average score of married individuals was 72.0 (Sd = 4.5), while the average of

single individuals was calculated as 68.2 (Sd = 4.8). The value of $t(68) = 3.073$, $p = 0.003$ shows that married individuals have significantly higher scores in terms of cognitive skills. In the Autonomous Skills dimension, the average of married individuals was determined as 23.5 (Sd = 3.2), while the average of single individuals was determined as 21.0 (Sd = 3.0). The result of $t(68) = 3.426$, $p = 0.001$ shows that married individuals have significantly higher scores in autonomous skills. A similar situation is observed in terms of Collaborative and Flexibility Skills. The average score of married individuals was calculated as 22.0 (SD = 2.7), while the average score of single individuals was calculated as 19.5 (SD = 3.1). $t(68) = 3.395$, $p = 0.001$ value shows that married individuals have significantly higher scores in collaborative and flexibility skills. In the Innovative Skills dimension, the average score of married individuals was determined as 9.1 (SD = 1.7), while the average of single individuals was determined as 7.5 (SD = 2.0). The result of $t(68) = 4.599$, $p < 0.001$ shows that married individuals have significantly higher innovative skills. In summary, it was determined that the skill levels of married individuals were significantly higher than single individuals in all sub-dimensions. This situation suggests that marital status may have an effect on 21st century learner skills .

Table 6. ANOVA-Test Results According to Professional Seniority

Sub-dimensions	Professional Seniority	Avg.	Ss .	F	p
Cognitive Skills	1–5 years	66.5	4.7	1,756	0.164
	6–10 years	70.8	4.5		
	11–15 years	71.2	4.6		
	16 years and above	69.9	4.8		
Autonomous Skills	1–5 years	20.8	3.5	1,630	0.190
	6–10 years	21.9	3.2		
	11–15 years	22.3	3.4		
	16 years and above	21.5	3.1		
Collaborative and Resilience Skills	1–5 years	18.9	3.1	2,022	0.119
	6–10 years	20.5	2.9		
	11–15 years	21.0	3.2		
	16 years and above	19.8	3.0		
Innovative Skills	1–5 years	7.8	1.9	0.396	0.756
	6–10 years	8.4	1.7		
	11–15 years	8.7	1.8		
	16 years and above	8.0	2.0		

According to the data in the table, when the ANOVA test results conducted according to the professional seniority variable are examined, it is seen that different seniority groups do not show a significant difference in terms of cognitive, autonomous, collaborative and flexibility skills and innovative skills ($p > 0.05$). In terms of Cognitive Skills, the highest average score of 71.2 (SD = 4.6) was observed in teachers with 11-15 years of professional seniority, while the lowest average score of 66.5 (SD = 4.7) was observed in teachers with 1-5 years of experience. However, the result of $F(3, 66) = 1.756$, $p = 0.164$ shows that there is no statistically significant difference in terms of cognitive skills between professional seniority groups. In terms of Autonomous Skills, teachers with 11-15 years of seniority had the highest average score with 22.3 (Sd = 3.4), while teachers with 1-5 years of seniority had the lowest average score with 20.8 (Sd = 3.5). However, $F(3, 66) = 1.630$, $p = 0.190$ shows that the difference between the groups is not statistically significant. In terms of Collaborative and Flexibility Skills, the highest average was calculated as 21.0 (Sd = 3.2) in teachers with 11-15 years of seniority, while the lowest average was seen in teachers with 1-5 years of seniority with 18.9 (Sd = 3.1). However, $F(3, 66) = 2.022$, $p = 0.119$ shows that there is no significant difference according to professional seniority. In terms of Innovative Skills, the highest mean score of 8.7 (SD = 1.8) was observed in teachers with 11-15 years of experience, while the lowest mean score of 7.8 (SD = 1.9) was observed in teachers with 1-5 years of experience. However, $F(3, 66) = 0.396$, $p = 0.756$ shows that this difference is not statistically significant.

5. CONCLUSION AND RECOMMENDATIONS
As a result of the research, it was determined that the general level of science teachers regarding 21st century learner skills was at a medium level. It was observed that teachers used these skills at a "sometimes" level, and that the frequency of use was higher only in cognitive skills compared to other skills. It is noteworthy that the

levels of use of autonomous, collaborative-flexible and innovative skills were lower. This situation shows that teachers are more active in information processing and analysis processes; however, they are limited in the classroom applications of skills such as innovation, collaboration and independent learning.

In the analyses conducted in terms of gender variable, it was determined that female teachers performed at higher levels than male teachers in cognitive, collaborative and innovative skills. No significant gender-based difference was found in terms of autonomous skills. These findings indicate that gender-based differences may emerge in some skill areas.

In the evaluations made according to age groups, no significant difference was found between different age groups in terms of 21st century skills. This finding reveals that teachers use these skills at similar levels regardless of their age. Similarly, it was observed that there was no significant difference in the level of teachers' use of these skills in terms of professional seniority variable. This situation suggests that the length of service does not have a direct effect on the use of 21st century skills.

The marital status variable was a notable variable in the research results. It was observed that married teachers exhibited higher levels of skill in all skill areas compared to single teachers. This finding suggests that life experiences and levels of responsibility can contribute to the development of 21st century skills.

revealed that teachers are stronger especially in the cognitive field, however, there is a need for development in innovation, collaboration and autonomous skills. This situation shows that teachers need to be supported more in 21st century skills in professional development programs. Considering that individual variables such as gender and marital status have an effect on some skills, it is recommended to develop special support strategies for different groups.

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