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Analyzing Vocational High Schools Within the 21st Century Learner and Teacher skills Spectrum

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Abstract

This study aims to offer insights regarding the schools providing vocational and technical education in Turkey by determining the students and teachers' usage levels of the 21st century teaching and learner skills. 42 teachers and 269 students participated in this study. Qualitative and quantitative research methods were applied together in the study. The quantitative data were collected with 21st century teaching and learner skills usage scales, and qualitative data was collected with a structured interview form. It has been determined that teachers working in vocational high schools and the students generally use their teaching and learner skills in their educational practice. It was observed teachers could not use flexible teacher skills more than other skills during teaching, and students reflected cognitive and innovative skills more to their learning process more than other skills in their vocational education. There was no significant difference found between the 21st century teacher skills usage and variables of gender, teaching field type, age, length of service and graduated faculty. A significant difference was found between students' usage of 21st century learner skills and the variables of gender and maternal education. However, no significant difference was found between these skills of students and variables of field study, paternal education level and family income level. Students in vocational high schools stated that they primarily utilized the internet to gain information. Teachers did not consider that the school facilities and the curriculum are sufficient for gaining and practising teaching 21st century skills in a professional sense as they perceived themselves as competent. Students also did not consider school facilities and the curriculum sufficient for gaining and applying the 21st century learner skills in the professional context. Moreover, students considered the teacher competence sufficient for acquiring the 21st century learner skills as they did not have the same opinion for practice. Teachers' innovative skills stand out in the qualitative findings regarding their definition of a "21st century learner". Students' definition of "21st century teacher" highlights

Keywords

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administrative skills as a central component. It should be ensured that teachers and students learn to train themselves in a way that is open to innovation and change. Teachers and students should be gain awareness regarding teaching and learning shall not be limited to the classroom.

Introduction

Nowadays, countries are experiencing various global, economic and technological transformations. Thus, the necessary and sometimes unintentional changes occur in specific systems of the countries. All education systems, from pre-school to higher education, from formal education to non-formal education, have been affected by these changes, numerous new trends towards achieving world standards, and various programs and practices have been implemented. The prediction that "technology will dominate educational vision in the future (Stevenson, 2010)" has become a reality, as the education programs include "democratic ideals and values education, effective citizenship education, lifelong learning, learning to learn, global connections, communication, 21st century life skills and vocational development" (Gültekin, 2014).

Trends in educational programs highlight the 21st century skills that need to be developed in students (Gültekin, 2014). Realizing the constantly changing, with time and conditions (Sayın & Seferoğlu, 2016), 21st century learning necessary for students to be successful in business, life and citizenship skills, critical thinking, problem solving, creative thinking, metacognitive awareness, communication, collaboration, digital competencies, information and technology literacy, flexibility and adaptability, social and cultural competencies, global awareness and financial literacy can be considered together in a more extensive structure (Assessment and Teaching of 21st Century Skills [ATC21S], 2012; Binkley et al., 2010; Care & Kim, 2018; Lemke, Coughlin, Thadani, & Martin, 2003; Partnership for 21st Century Learning [P21], 2019; Trilling & Fadel, 2009). Most 21st century skills such as "entrepreneurship, leadership, teamwork, collaboration, digital skills, economic and financial literacy" encourage vocational development, skills such as "civic skills, literacy and mathematics knowledge" encourage academic development (European Center for the Development of Vocational Training [CEDEFOP], 2020).

21st century learners endowed with the skills to "survive" in the future world (Wagner, 2008) have characteristics such as "establishing a connection with everyday life, being curious and interested in new developments, thinking critically, questioning and researching, having international professional competencies, having verbal and written expression skills, using time efficiently, taking responsibility, respecting people, having a sociable personality, having social sensitivity and cultural values, being moral, having a vision of solidarity and benevolence, being productive, having problem solving skills, being able to make their own decisions, being able to criticize oneself, having the habit of collaboration, knowing the ways to access information, being able to benefit from information technologies (Education Research and Development Department [EARGED], 2011).

As the learning stakeholder of education systems is the 21st century learner, it is necessary to familiarize with the 21st century learners and their skills to increase teaching processes' effectiveness (Orhan Göksün & Kurt, 2017). Learner skills are categorized as cognitive skills, autonomous skills, collaboration and flexibility skills, and innovation skills (Orhan Göksün, 2016).

Cognitive skills: These are skills that cover processes such as acquiring, analyzing and synthesizing information. Moreover, the individual is aware of the products formed with the activities that occur in the mental information processes (Orhan Göksün, 2016). Cognitive skills include using technology and information tools, knowledge and media literacy (American Association of School Librarians [AASL], 2009; Köğce, Özpınar, Mandacı Şahin, & Aydoğan Yenmez, 2014; Orhan Göksün, 2016; Pedró, 2006; P21, 2019; Trilling & Fadel, 2009; Wagner, 2008).

Autonomous skills: Are the autonomous learner skills that emerge with the integration of self-management, self-control and individual or group working skills (Orhan Göksün, 2016). These skills include self-awareness and progress and development towards it, researching, questioning, being creative, critical, open to communication, empathic, self-confident, learning to learn, active in learning and social life, social and free, knowing personal, social and religious values and rights and respecting them (Aydemir, Karalı, & Coşanay, 2020; Köğce et al., 2014; Orhan Göksün, 2016; P21, 2019; Tok, 2011; Trilling & Fadel, 2009; Wagner, 2008).

Collaboration and flexibility skills: Collaborative skills bring the success of activities and learning environments made more flexible through broadening them (Orhan Göksün, 2016). Individual learning increases with sharing knowledge and building collaborative learning environments (Köğce et al., 2014). These skills include participation and interest in lectures, cooperation with other students and teachers, flexible behavior, cooperative learning and group work (Köğce et al., 2014; Orhan Göksün, 2016; P21, 2019; Trilling & Fadel, 2009; Wagner, 2008).

Innovation skills: Are the adaptability to new technologies (Orhan Göksün, 2016). Innovation skills comprise information and communication technologies literacy, being curious, active, and open to new learning, innovations, change and development (Köğce et al., 2014; Orhan Göksün, 2016; Pedró, 2006; P21, 2019; Trilling & Fadel, 2009).

The target of education is the student; therefore, the teachers' qualifications must constantly improve (EARGED, 2001). Being a 21st century student relies on 21st century teachers. It is necessary to be someone who has 21st century teacher qualifications and teaching skills (Yalçın İncik, 2020), who updates his professional development in line with the requirements of the age and carries it to his lessons (Uyar & Çiçek, 2021). 21st century teachers endowed with skills to apply them in educational processes enable their students to acquire and use these skills (Kılıç, 2015).

Teachers should have the competencies in "professional knowledge, skills, attitudes and values" (Ministry of National Education [MoNE], 2017). It is known that teachers are aware of the significance of personal and professional development competencies and their reflections on other stages of education (Erten, 2018).

Teachers can take a more learner-centered approach towards learning with the technology and accommodate multiple learning styles. Teachers may use technology for online research and vocational development, classroom management, and administrative data collection (Good, 1999). Competence in information-communication technologies is effective in having sufficient 21st century skills (Erten, 2020).

A qualified, effective and modern teacher must have the following qualifications to meet the contemporary educational needs of the information technology society and to prepare the students for the future (EARGED, 2001):

Expertise in the subject area: Knowing concepts, principles and generalizations, associating them with other subjects and daily life and following the developments in the discipline.

Student development knowledge: Familiarizing with the students, observing individual differences, connecting student development and learning, performing motivational activities for the student, being sympathetic, helping solve student's problems, taking measures for the education of students who are physically and mentally different.

Competency in planning teaching: Knowing how to plan the course activity, exchanging information and cooperation with other teachers, determining target behaviors, teaching methods, using educational and teaching tools, performing meaningful and permanent learning, encouraging students to think and research, using methods that enable students to assess themselves, organizing activities in line with the student feedback, applying a student-centered education, knowing and applying techniques that can measure, evaluate and appreciate student success.

Multiple teaching strategies: Using teaching methods and techniques for a subject, benefitting information-communication technologies, using techniques to make the educational environment efficient, teaching scientific methods to students.

Classroom management and activities: Communicating, organizing the learning environment, ensuring students' active participation in the lessons, effective use of speech and body language and educational tools.

Ensuring vocational development: Knowing the laws, rights, and responsibilities regarding the profession, following the developments and activities, and adapting them.

Social and environmental competency: Taking a role in preparing social, cultural and sports activities, providing coordination with other institutions, detecting the problems in the education system and producing solutions.

Personal qualities for the profession: Being attentive to external appearance, generating new ideas, having an open mind, being patient, helpful, friendly, affectionate, impartial, self-confident, and respectful to democratic values and human rights, open to innovation, development and criticism, protecting cultural values, loving students and the profession.

The teacher characteristics have been emphasized in many institutions and studies (Lemov, 2010; MoNE, 2017; Mızrak Karcı, 2016; Taşkaya, 2012; Türk Eğitim Derneği, 2009). There is a global gap between what is taught and tested even in the pioneering schools and what all students, workers and citizens need to succeed in the modern global information economy. The education that teachers of the future receive in schools is not sufficient for what is needed (Wagner, 2008). The role of teachers in the 21st century is different compared to the past (Kozikoğlu & Özcanlı, 2020) and became the determinants of the current teacher training systems (Orhan Göksün, 2016). Teachers are an important factor in the education process (EARGED, 2001; Orhan Göksün, 2016).

Teachers' skills play a key role in students' learning, motivation and success (Kozikoğlu & Özcanlı, 2020). In the 21st century, teachers have a qualification of guidance in a multi-dimensional learning environment, shares the teaching role with various structures, and are aware of how one prepares students for the future (Gümüş, 2019). It is difficult for a teacher to bring a skill to the students if one does not have it. The teachers who cannot provide education according to the 21st century vision will not be able to reach the desired student profile (EARGED, 2011). Therefore, teacher skills are vital in education. 21st century teacher skills are categorized as "administrative, technopedagogical, affirmative, flexible teaching and productive skills" (Orhan Göksün, 2016).

Administrative skills: Teacher skills such as classroom, process and activity management (Orhan Göksün, 2016). "Classroom, process and activity management, self-management skills, teacher-student interaction, communication, cooperation, personal and professional characteristics" are also included in this skill (EARGED, 2001; MoNE, 2017; Mızrak Karcı, 2016; Orhan Göksün, 2016; Taşkaya, 2012).

Technopedagogical skills: Teachers' combined use of technology and pedagogy skills comprise these skills (Orhan Göksün, 2016). Contemporary scholarship determined that blending technology and pedagogy, being open to innovations and reflecting on teaching are among these skills (International Society for Technology in Education [ISTE], 2021; Koehler & Mishra, 2009; Lemov, 2010; MoNE, 2017; Orhan Göksün, 2016).

Affirmative skills: The demonstration of teachers' approaches to approve correct behaviors in the learning environment by transforming them into teacher skills (Orhan Göksün, 2016). These skills include respecting learner behaviors, differences, and rights, taking these into account, approving and using reinforcements to ensure correct behaviour continuity (EARGED, 2001; Lemov, 2010; MoNE, 2017; Orhan Göksün, 2016).

Flexible teacher skills: Teachers' ability to make teaching independent from the classroom environment (Orhan Göksün, 2016). The ability to perform teaching activities and practices besides the classroom is a flexible teaching skill (MoNE, 2017; Orhan Göksün, 2016; P21, 2019).

Productive skills: Teachers' material production skills (Orhan Göksün, 2016). These skills include enriching teaching with new, different materials and practices (MoNE, 2017; Orhan Göksün, 2016).

Vocational education and training cannot have a static and stable picture in this age. External factors (social and demographic changes, technological developments, economic changes) influence the vocational training system's institutional structure and education processes. The changes caused by these effects should be considered from the epistemological, pedagogical, socioeconomic, labor market, and education system perspectives and solutions should be produced in this regard (CEDEFOP, 2020). Meeting the demands of education, business, and commerce in the 21st century requires additional layers of communication skills, technological insight, global perspective, collaborative applications, digital skills and more innovative applications rather than memorization. Success depends on a symbiotic relationship between educators and business and trade forces (Geisinger, 2016).

21st century skills are what the workplaces demand from their employees besides vocational and technical knowledge. It is essential to acquire these skills for individuals studying in these institutions (Mahiroğlu, 2019). In the Global Skills Index 2020 (Coursera, 2020) report, which makes a global assessment of today's trend skills, Turkey is in the category of developing countries in the business world with 37%; it is in the category of lagging countries with 10% in the field of technology and 8% in the field of data science. Turkey ranks 38th in the business world, 54th in technology and 55th in data science among 60 countries. Due to the changing structure of the skills required for the 21st century, the need to develop the skills of the workforce in Turkey and the economic crises experienced throughout the world have necessitated high quality vocational training. It is important to know the characteristics of the first stakeholders such as teachers and students on how to support and achieve these improvements and developments in vocational and technical education, which will encourage reasoning regarding the principles and pedagogy of vocational and technical education and support the sector according to the 21st century perspective.

When the literature on 21st century teacher and learner skills is examined, it is seen that there are many studies (Aydemir et al., 2020; Bunker, 2012; Cemaloğlu, Arslangilay, Üstündağ, & Bilasa, 2019; Certel, Bahadır, & Topuz, 2019; Eğmir & Çengelci, 2020; Gürültü, Aslan, & Alcı, 2018, 2020; Kıyasoğlu & Çeviker Ay, 2020; Kozikoğlu & Özcanlı, 2020; Peker, 2019; Zeybek, 2019). However, the scholarship on vocational and technical education in high schools, including the students and teachers from these institutions, is quite limited. This study also provides insights regarding how much these institutions reflect the 21st century teaching and learning characteristics and designed to be an accurate indicator regarding the 21st century educational status.

Purpose

It is aimed to offer insights regarding the schools providing vocational and technical education in Turkey through determining the usage levels of the 21st century teaching and learner skills by the students and teachers in high schools where vocational and technical education is given. In this context;

- What are the usage levels of 21st century teacher skills by vocational high school teachers?
- What are the usage levels of 21st century learner skills by vocational high school students?

- Does the use of 21st century teacher skills usage differ by teachers' demographic variables (gender, teaching field type, age, length of service, and the faculty graduated from)?
- Does the use of 21st century learner skills differ by students' demographic variables (gender, education field, mother's education level, father's education level and family income level)?
- What is the first source that students studying at vocational high schools apply to have information about a subject?
- What are the competencies of vocational high schools for acquiring and applying 21st century teacher and learner skills?
- What are the characteristics of the learner of the 21st century according to the teachers working in vocational high schools, and of the teachers of the 21st century according to the students who study?

Methodology

The single survey and causality comparison survey models of quantitative tradition were used. A survey model is a quantitative method to describe the participants' attitudes, opinions, behaviors or characteristics (Creswell, 2012). The single survey model (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz, & Demirel, 2016) through which a variable or variables are examined separately as 21st century teachers and students' usage levels of teaching and learner skills was analyzed. The causality comparison survey model (Balcı, 2009), which obtains the possible causes of the event or phenomenon by comparing the participants with a feature and those without, how the use of 21st century teaching and learner skills differ by demographic variables was shown.

Moreover, qualitative data were collected from the participants. Survey studies can collect quantitative data besides qualitative data. The interview method can be used as in qualitative research as in-depth information on the subject is collected from the participants (Büyüköztürk et al., 2016). The structured interview technique (Büyüköztürk et al., 2016; Sönmez & Alacapınar, 2016; Türnüklü, 2000), in which the participants were asked pre-determined questions with the same style and quality, was applied. The structured interview technique is generally used in quantitative research (Sönmez & Alacapınar, 2016). The forms with open-ended and closed questions obtained the participant opinions about other sub-objectives of the study.

Population and Sampling

The research population comprise teachers and students in vocational and technical high schools in Bingöl city center for the first semester of the 2019-2020 academic year. Sampling was not used as the entire population was attempted to reach. Teachers from all Vocational and Technical Anatolian High School branches were included in the study, while only 11th grade students were included. Students select their vocational areas in the 10th grade, and they are just beginning to courses related to their vocational high schools. 11th graders were selected because they were more appropriate for the study purpose, as 12th graders received training in firms on certain weekdays.

The data updated on the General Directorate of Vocational and Technical Education's official website in October 2019 shows that the number of teachers is 191 and the number of students is 477 (General Directorate of Vocational and Technical Education, 2019). However, the number of teachers reached was limited to 42 and the number of students to 269 due to the negative attitude of the administration of a school towards the implementation, some teachers and students in other schools did not participate in the study voluntarily, and excluding the incomplete and empty questionnaires. It was determined that the number of participants is appropriate for the sample's homogeneity in cases where the population is finite, according to the theoretical sample size acceptance regarding sample representation of a population (Can, 2016).

Table 1. Demographic Characteristics of Teachers

	f	%
Gender		
Female	11	26.2
Male	31	73.8
Age		
20-30 age	10	23.8
31-40 age	23	54.8
41 age and over	9	21.4
The Term of Service		
5 years and less	13	31.0
6-10 years	14	33.3
11-15 years	5	11.9
16-20 years	5	11.9
21 years and above	5	11.9
Branch		
Information Technology	2	4.8
Justice	2	4.8
Accounting and Finance	5	11.9
Physical	1	2.4
Mathematics	3	7.1
Electrical-Electronics	2	4.8
Geography	2	4.8
Biology	3	7.1
The English	6	14.3
Turkish Language and Literature	3	7.1
Philosophy	4	9.5
Religious Culture and Moral Knowledge	1	2.4
Health Services	3	7.1
Chemistry	1	2.4
Visual arts	1	2.4
History	1	2.4
Machine	2	4.8
Education Status		
Licence	36	85.7
Postgraduate	6	14.3
The Graduated Faculty		
Education	9	21.4
Arts and Sciences	17	40.5
Other	16	38.1
The Teaching Field Type		
Culture	27	64.3
Vocational	15	35.7
Total	**42**	**100.0**

It was observed that male teachers were the majority It is seen in the table that the service period of the teachers is also low due to the low average age. Moreover, it was understood that the majority of the teachers in the study are the teachers who teach courses other than vocational courses, which are qualified as cultural courses. Teachers who graduated from the Faculty of Education constitute 21.4%, those who graduated from the Faculty of Arts and Sciences 40.5% and those who graduated from other faculties constitute 38.1% of the sample. Other faculties include Theology, Technical Education,

Engineering Faculties and Colleges. It was observed that very few of the teachers in Vocational and Technical Education schools have a postgraduate degree.

The demographic characteristics of the students are provided in the table below.

Table 2. Demographic Characteristics of Students

	f	%
Gender		
Female	73	27.1
Male	196	72.9
The Study Field		
Information Technology	28	10.4
Justice	24	8.9
Accounting and Finance	37	13.8
Marketing and Retail	23	8.6
Furniture and Interior Design	20	7.4
Electrical-Electronics Technology	62	23.0
Machine Technology	25	9.3
Health Services	50	18.6
Maternal Education Status		
Illiterate	83	30.9
Primary School	120	44.6
Secondary School	32	11.9
High School	29	10.8
University	5	1.9
Paternal Education Status		
Illiterate	18	6.7
Primary School	111	41.3
Secondary School	73	27.1
High School	40	14.9
University	27	10.0
Family Income Level		
Below The Minimum Wage	105	39.0
Between 2020 TL-4000 TL	131	48.7
4001 TL ve above	33	12.3
Total	**269**	**100.0**

Male students are the majority in vocational high schools. This result is provided in the table. Electrical and Electronics Technology, Health Services, Accounting and Finance and Information Technologies had higher participation rates. Most parents are primary school graduates. Income levels of 61% of students' families are above the minimum wage.

Data Collection Tools

The questionnaire technique was used in the research. Although various data collection techniques such as observation and interview are used in survey models, including collecting information from multiple sources about the same variables or situations, the most frequently used data collection technique is the questionnaire (De Vaus, 2002). This technique obtains the participant opinions on the subject and open-ended, closed-ended, classified and sorted questions, demographic information and scale items (Kaptan, 1998; Karasar, 2003; Sönmez & Alacapınar, 2016). Scales of using 21st century teaching and learner skills studied by Orhan Göksün (2016) were used in the study. These scales are five-point Likert type. The 21st century learner skills use scale consists of four factors (cognitive skills, autonomous skills, cooperation and flexibility skills, and innovativeness skills) and 31 items. The total explained variance of the scale was calculated as 34.75%, and the internal consistency coefficient

was 0.892. The 21st century teacher skills use scale consists of five factors (administrative skills, technopedagogical skills, affirmative skills, flexible teacher skills, and productive skills) and 27 items. The total explained variance of the scale was 40.33%, and the internal consistency coefficient was 0.870 (Orhan Göksün, 2016).

There was also a personal information section in which demographic information was obtained. Information on gender, branch, age, length of service, educational status, graduated faculty from the teachers and details regarding gender, school, vocational fields, family income level, and parents' educational status were requested from the students.

These data were also collected through open and closed-ended questions in the questionnaire form under the structured interview technique, while the qualitative data were also collected from the participants. The teachers were asked two questions: "Are the school facilities, teachers and curriculum sufficient for vocational acquiring and applying 21st century teacher skills?" and "What is your 21st century learner ideal?" in the form. As the students were asked, "What is the first source you resort to when you want to have information on a subject?", "Are the school facilities, teachers and curriculum sufficient for vocational acquiring and applying 21st century teacher skills?" and "What is your 21st century teacher ideal?"

Data Collection and Analysis

The necessary permissions were obtained from the institutions for the teachers and students in the vocational high schools. The forms required for application was copied and applied in schools. Two separate forms were prepared for students and teachers. First, the school administrations were reached, and the application was performed for the teachers and students in line with the administrative instructions. This application was conducted voluntarily. Despite having ethical and practical permissions, a school administration exhibited a negative attitude towards the application, and some teachers and students did not want to participate. Therefore, the number of participants expected to be reached was decreased, but this did not affect the reliability. Teachers and students completed the questionnaires without providing identity information. It was ensured that the participant was not exposed and provided reliable information. The questionnaires were completed and collected, sometimes in the same period and sometimes after deadlines. Most of the surveys distributed have been collected. Those that were left blank or incomplete the questionnaires were not included in the study.

The statistical package program SPSS was used for the quantitative data analysis, and content analysis was used for the qualitative data analysis. Kolmogorov Smirnov and Shapiro-Wilks normality tests were applied to test whether the data showed normal distribution. The parametric tests with normal distribution and non-parametric tests are used when the distribution is not normal (Büyüköztürk, 2013). The normality test revealed that parametric tests for scales should be +applied to teachers, non-parametric tests for gender variable for scales applied to students, and parametric tests for other variables were found suitable. Cronbach's alpha reliability coefficients of these scales applied to determine vocational high-school teachers and students' 21st century skills were calculated as 0.868 and 0.892, respectively. A reliability coefficient of 0.70 and above is sufficient for the test score reliability (Büyüköztürk, 2013). After the normality tests, descriptive statistics, frequency, percentage, independent groups t-test, one-way analysis of variance, the Mann Whitney U test, and the multiple comparisons and Levene test were performed. The significance value of the study is 0.05, arithmetic mean value of the scale has been interpreted based on the statements of never "1.00-1.80", "1.81-2.60" rarely, "2.61-3.40" sometimes, "3.41-4.20" usually and "4.21-5.00" always, used in the five-point Likert type scale evaluation range.

The qualitative data collected from teachers and students was examined with content analysis in which the text and the content of the document are analyzed (Sönmez & Alacapınar, 2016). The data is divided into categories as correlations and connections are established. Interpretations were made through these connections. After being classified as main and sub-themes, their frequency levels were also determined. By digitizing, the reliability of qualitative data has been increased, the opportunity to make comparisons has been gained, its bias has been reduced, and it has been made possible to re-apply (Yıldırım & Şimşek, 2011). The analysis steps, process and results are shown clearly and consistently for the credibility (internal validity), transferability (external validity), consistency (internal reliability) and confirmability (external reliability) of the research. For the validity and reliability of the research, coding and themes were reviewed again and in the presence of an expert; detailed reporting and description processes were carried out, quantitative study data and interview data were evaluated together; literature review has been tried to be done well; Direct quotations were made from the data obtained from the participants. A coding system was applied for the participants. The direct quotations are made according to these codes. It is considered sufficient for the validity of how the qualitative data and results are reached, and the detailing of the subject, giving in detail the characteristics of the research sample so that it can be compared with other samples (Yıldırım & Şimşek, 2011).

Findings and Comment

The Usage Levels of 21st Century Teacher Skills by Vocational High School Teachers

The level of 21st century teacher skills usage by teachers was tried to be determined. The total scores of the teachers and their levels for the sub-dimensions are provided in the table below.

Table 3. Arithmetic Mean and Standard Deviation Regarding the Level of 21st Century Teacher Skills Usage by the Teachers Scale and Its Sub-Dimensions

The Teacher Skills Use and Its Sub-Dimensions	n	$\bar{x}$	sd
Administrative Skills	42	3.78	0.46
Technopedagogical Skills		3.54	0.52
Affirmative Skills		4.42	0.51
Flexible Teaching Skills		3.10	0.97
Productive Skills		3.45	0.83
Level of Use of Teacher Skills		3.70	0.43

The table's descriptive statistics results show that teachers usually use the 21st century teacher skills ($\bar{x}$= 3.70). This result may be an indication that teachers use these skills in the teaching process. It was determined that the Affirmative skills were always used ($\bar{x}$= 4.42), administrative ($\bar{x}$= 3.78), technopedagogical ($\bar{x}$= 3.54), and productive skills ($\bar{x}$= 3.45) were usually used, and flexible teaching skill ($\bar{x}$= 3.10) were sometimes used. The teachers stated that they used all 21st century teaching sub-dimensions of affirmative, administrative, technopedagogical, productive, and flexible teaching processes. Teachers' affirmative skills have a higher usage level than other skills, which might be attributed to the transformation from the oppressive, authoritarian and judgmental environments of learning environments into democratic, mutual love-respect, supportive environments with a constructivist approach (Aydemir et al., 2020). It shows that teachers' ability to use these teacher skills in the teaching process significantly affects students' learning. Thus, quality and qualified learning are realized. However, it was found that flexible teaching skill remains at a lower level compared to other skills. It was observed that teachers do not use flexible teacher skills (Orhan Göksün, 2016), making teaching independent from the classroom environment frequently. Besides, using this skill more in vocational high schools shall enable the integration of education with life. It should help students apply what they have learned in the classroom, solve real life problems, and adapt to what they have learned.

The Usage Levels of 21st Century Learner Skills by Vocational High School Students

The arithmetic means and standard deviations regarding the vocational high school students use of 21st century learner skills. The relevant results are available in Table 4.

Table 4. Arithmetic Mean and Standard Deviation Regarding the Learner skills Use Scale and Its Sub-Dimensions

The Learner Skills Use and Its Sub-Dimensions	n	$\bar{x}$	sd
Cognitive Skills		3.57	0.67
Autonomous Skills		3.28	0.80
Collaboration and Flexibility Skills	269	3.18	0.79
Innovation Skills		3.49	1.07
Level of Use of Learner Skills		3.43	0.61

Table 4 shows that the vocational high school students' use of 21st century learner skills is moderate ($\bar{x}$= 3.43). It can be argued that students use these skills in their educational lives. Regarding the scale factors, students stated that they usually use cognitive ($\bar{x}$= 3.57) and innovative skills ($\bar{x}$= 3.49) and sometimes use autonomous ($\bar{x}$= 3.28), collaboration and flexibility skills ($\bar{x}$= 3.18). This finding suggests that students use all dimensions of the 21st century learner skills in education and training processes, but they use cognitive and innovative skills more than other skills. It can be asserted that students are intertwined with technologies during their vocational education, and cognitive and innovative skills are better developed due to the cognitive skills education, and they reflect this in their learning experience. Likewise, it can be thought that the vocational education and training program is not in a way to highlight the autonomous learning (Orhan Göksün, 2016), which is the autonomous skill of students, and cooperation and flexibility skills, or because the application cannot be realized, it can be thought that students cannot apply it much in their learning processes.

The Differentiation of the Uses of 21st Century Teaching Skills in Terms of Demographic Variables (Gender, Teaching Field Type, Age, Length of Service, and The Faculty Graduated from)

Analysis results regarding the evaluation of 21st century teacher skills use by teachers according to the gender variable are shown in Table 5.

Table 5. t-test Results According to the Gender Variable Regarding the use of 21st Century Teacher Skills by Teachers

Gender	n	$\bar{x}$	sd	t	p
Female	11	3.71	0.53	0.083	0.935
Man	31	3.70	0.39		

Table 5 indicates that there is no significant difference in teachers' use of 21st century teacher skills by the gender variable ($t_{(40)}$=0.083, p>0.05). Female ($\bar{x}$= 3.71) and male ($\bar{x}$= 3.70) teachers use the 21st century teacher skills at the 'usually' level. It can be concluded that the gender variable is not a significant factor in the use of these skills as all teachers in the teaching process usually use them.

The results obtained regarding the evaluation of 21st century teacher skills use of teachers by teaching field variable are provided in Table 6.

Table 6. t-test Results According to the Teaching Field Variable Regarding the Use of Teacher Skills by Teachers

The Teaching Field	n	$\bar{x}$	sd	t	p
Culture Course Teacher	27	3.66	0.37	-0.971	0.337
Vocational Course Teacher	15	3.79	0.51		

There was no significant difference in the use of 21st century teacher skills by teachers' teaching fields ($t_{(40)}$=-0.971, p>0.05). The arithmetic average of the teachers showed that the Culture ($\bar{x}$= 3.66) and vocational ($\bar{x}$= 3.79) teachers usually use these skills. It can be stated that both culture and vocational course teachers usually use 21st century teacher skills in the classroom environment.

The analysis results that show how teachers' use of 21st century teacher skills differs by the age variable is provided in the table below.

Table 7. Variance Analysis Results According to the Age Variable Regarding the Use of 21st Century Teacher Skills by Teachers

Age	n	$\bar{x}$	sd	Source of Variance	Sum of Squares	df	Mean Square	F	p
20-30 age	10	3.84	0.37	Between Groups	0.322	2	0.161		
31-40 age	23	3.69	0.44	Within Groups	7.092	39	0.182	0.886	0.420
41 age and over	9	3.59	0.45	Total	7.414	41			

Levene: 0.019; p= 0.982

There was no significant difference in teachers' use of 21st century teacher skills by the age variable ($F_{(2-39)}$=0.886, p>0.05). The table reveals that teachers of all age groups usually use 21st century teacher skills. It can be thought that age does not change their use of these skills.

The results obtained regarding the evaluation of 21st century teacher skills use of teachers, and their term of service are provided in Table 8.

Table 8. Variance Analysis Results According to the Term of Service Variable Regarding the Use of 21st Century Teacher Skills by Teachers

The Term of Service	n	$\bar{x}$	sd	Source of Variance	Sum of Squares	df	Mean Square	F	p
5 years and less	13	3.78	0.34						
6-10 years	14	3.66	0.48	Between Groups	1.322	4	0.331		
11-15 years	5	3.49	0.14					2.008	0.114
16-20 years	5	4.08	0.35	Within Groups	6.092	37	0.165		
21 years and above	5	3.47	0.52	Total	7.414	41			

Levene: 1.477; p= 0.229

The variance analysis in Table 8 concluded that there were no significant correlations between the length of teaching service and the use of 21st century teacher skills ($F_{(4-37)}$= 2.008, p>0.05). Although teachers' term of service has changed, it was found that they generally use 21st century teacher skills. This finding may indicate that teachers improved themselves over time using all available opportunities and they have a good command of their teacher skills.

The variance analysis results that show how teachers' use of 21st century teacher skills differs by the graduated faculty variable is provided in Table 9.

Table 9. Variance Analysis Results According to the Graduated Faculty Variable Regarding the Use of Teacher Skills by Teachers

The Graduated Faculty	n	x̄	sd	Source of Variance	Sum of Squares	df	Mean Square	F	p
Education	9	3.79	0.36	Between Groups	0.762	2	0.381	2.234	0.121
Arts and Sciences	17	3.54	0.31	Within Groups	6.652	39	0.171		
Other	16	3.83	0.52	Total	7.414	41			

Levene: 2.894; p= 0.067

The study results revealed that there is a significant difference in the use of 21st century teacher skills of vocational high school teachers by the graduated faculty variable ($F_{(2-39)}$= 2.234, p>0.05). Teachers usually use these skills is by the faculties they graduated from. This result indicates that teachers may have received training in the acquisition and use of these skills at the faculties they graduated from. The universities now design their educational programs and infrastructure per the requirements of the age.

The Differentiation of the Uses of 21st Century Learning Skills in Terms of Demographic Variables (Gender, Education Field, Mother's Education Level, Father's Education Level and Family Income Level)

The results of the analysis conducted to determine the level of use of 21st century learner skills by the gender variable of the students included in the research are given in Table 10.

Table 10. Mann Whitney U Test Results According to the Gender Variable Regarding the Use of 21st Century Learner Skills by Students

Gender	n	Mean Rank	Sum of Ranks	U	p
Male	196	126.90	24872.50	5566.500	0.005*
Female	73	156.75	11442.50		

*p<0.05

Table 10 shows that there is a significant difference between the gender variable of the students and the level of use of 21st century learner skills (U=5566.500, p <0.05). It was determined that this difference was in favor of female students as they (MR=156.75) used these skills more than male students (MR=126.90). This result may indicate that female students care more and are more interested in the education and training process than male students. Moreover, the differences in brain structures may also affect the use of skills at different levels.

Analysis of variance was conducted to reveal whether there are differences between vocational high school students' use of 21st century learner skills and their fields of study. The result of this analysis is shown in Table 11.

Table 11. Variance Analysis Results According to the Study Field Variable Regarding Students' Use of 21st Century Learner skills

The Study Field	n	x̄	sd	Source of Variance	Sum of Squares	df	Mean Square	F	p
Accounting and Finance	37	3.44	0.57	Between Groups	2.508	7	0.358		
Marketing and Retail	23	3.37	0.38						
Information Technology	28	3.31	0.88						
Justice	24	3.46	0.55						
Electrical-Electronics Technology	62	3.41	0.55	Within Groups	96.370	261	0.369	0.971	0.453
Furniture and Interior Design	20	3.35	0.68						
Machine Technology	25	3.35	0.72	Total	98.878	268			
Health Services	50	3.62	0.56						

Levene: 1.274; p= 0.264

There was no significant correlation between students' study fields and their use of 21st century learner skills ($F_{(7-261)}$=0.971, p>0.05). It can be asserted that students use these skills in their educational lives, and their vocational competence increases their use. It can be thought that vocational field curricula also support these skills. Students in the fields of Accounting and Finance, Justice, Electrical-Electronics Technology and Health Services stated that they usually use the 21st century learner skills while the students in the Marketing and Retail, Information Technology, Furniture and Interior Design and Machine Technology fields stated that they sometimes used the 21st century learner skills.

The analysis result regarding the evaluation of the students' use of 21st century learner skills by maternal education status variable is detailed in table 12.

Table 12. Variance Analysis Results According to the Maternal Education Status Variable Regarding Students' Use of 21st Century Learner skills

Maternal Education Status	n	x̄	sd	Source of Variance	Sum of Squares	df	Mean Square	F	p	Significant Difference
Illiterate	83	3.39	0.54	Between Groups	3.672	4	0.918	2.546*	0.040	3-1,2 4-1,2
Primary School	120	3.37	0.63							
Secondary School	32	3.65	0.58							
High School	29	3.65	0.65	Within Groups	95.206	264	0.361			
University	5	3.25	0.68	Total	98.878	268				

Levene: 0.482; p= 0.749
*p<0.05

There is a significant correlation between students' maternal education status and their use of 21st century learner skills ($F_{(4-264)}$=2.546, p <0.05). The post-hoc test was applied to reveal which groups created this difference. This test revealed that the differentiation occurred due to students whose mothers were secondary and high school graduates and those whose mothers were illiterate or graduated from primary school. Students with maternal education status of graduated from secondary and high school usually use the 21st century learner skills. It can be argued that the maternal education status contributes to the use of these skills by the students. Since individuals are primarily educated by their mothers, it can be asserted that the first effect on the learning is actualized by their mothers and then continued with other actors.

A variance analysis was made to measure the correlations between the students' use of 21st century learner skills by paternal education status variable is detailed in table 12. The relevant data are provided below.

Table 13. Variance Analysis Results According to the Paternal Education Status Variable Regarding Students' Use of 21st Century Learner skills

Paternal Education Status	n	x̄	sd	Source of Variance	Sum of Squares	df	Mean Square	F	p
Illiterate	18	3.50	0.60	Between Groups	1.264	4	0.316	0.854	0.492
Primary School	111	3.36	0.59						
Secondary School	73	3.51	0.51						
High School	40	3.50	0.72	Within Groups	97.615	264	0.370		
University	27	3.42	0.74	Total	98.878	268			

Levene: 1.743; p= 0.141

There was no significant correlation between students' paternal education status and their use of 21st century learner skills ($F_{(4-264)}$=0.854, p>0.05). While the students whose paternal education level was at the primary school sometimes use these skills, those with higher paternal education status usually use them. Although the paternal education level varies, it can be concluded that the students' usage levels of the 21st century learner skills can be considered positive.

The analysis result regarding the evaluation between the vocational high school students' use of 21st century learner skills by family income level variable is detailed in table 14.

Table 14. Variance Analysis Results According to the Family Income Level Variable Regarding Students' Use of 21st Century Learner Skills

Family Income Level	n	x̄	sd	Source of Variance	Sum of Squares	df	Mean Square	F	p
Below The Minimum Wage	105	3.35	0.60	Between Groups	1.641	2	0.821	2.245	0.108
Between 2020 TL-4000 TL	131	3.51	0.56	Within Groups	97.237	266	0.366		
4001 TL ve above	33	3.41	0.75	Total	98.878	268			

Levene: 1.320; p= 0.269

There was no significant correlation between students' family income level and their use of 21st century learner skills ($F_{(2-266)}$=2.245, p>0.05). However, students with family income below the minimum wage sometimes used the 21st century learner skills while higher income levels reflected as usual usage. It can be concluded that an increase in student's family income level reflects positively on the level of 21st century learner skills usage.

The First Sources That Students Studying at Vocational High Schools Apply to Have Information

Students were asked what the first sources they resorted to when they wanted to learn about a topic. The students used multiple answers. These answers are included in the graphic below.

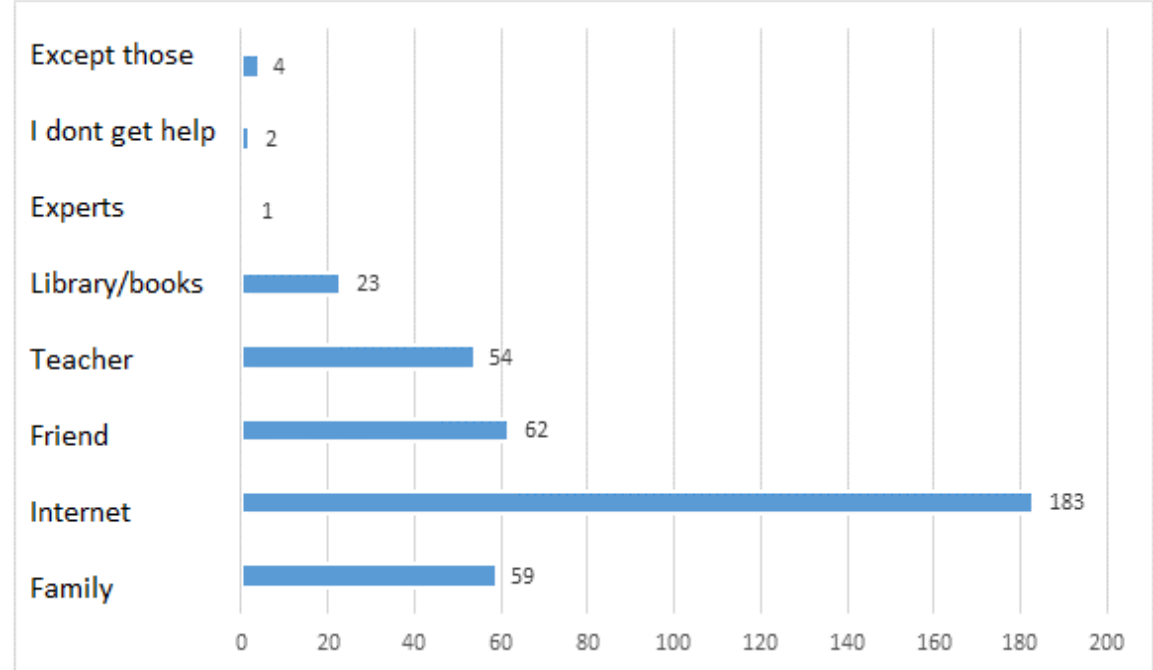

Figure 1. Students' Most Utilized Resources

Vocational high school students stated that they mostly used the internet (n=183) when they wanted to have information. It was not a coincidence that this result was reached because the students were from the "net generation" (Oblinger & Oblinger, 2005). The students stated that they most frequently resorted to friends, families, teachers, library/books, except those, not getting help and experts, outside of the internet. There are student expressions in the questionnaire forms that mention individuals outside the family, environment, imams and dependence on the environment. The student answers show that they focused on “what they reach at first” as information sources.

The vocationally sufficiency of school facilities, teachers and curriculum for acquiring and applying 21st century teacher skills

Teachers were asked whether the school facilities, teachers and the curriculum were vocationally sufficient for acquiring and applying 21st century teacher skills. The answers were evaluated according to the culture, and vocational course teachers and the results are provided in Table 15.

Table 15. Sufficiency Assessment of School Facilities, Teachers and Curriculum by Teachers for Acquiring and Implementing 21st Century Teacher skills*

		To gain in the 21st century teacher skills in the vocational context						To apply in the 21st century teacher skills in the vocational context					
		School Facilities Sufficiency		Teachers Sufficiency		Curriculum Sufficiency		School Facilities Sufficiency		Teachers Sufficiency		Curriculum Sufficiency	
		f	Total	f	Total	f	Total	f	Total	f	Total	f	Total
Yes	Culture	14	19	16	26	11	18	13	17	17	26	11	18
	Vocational	5	(%45.2)	10	(%61.9)	7	(%42.9)	4	(%40.5)	9	(%61.9)	7	(%42.9)
No	Culture	13	23	11	16	16	24	14	25	10	16	16	24
	Vocational	10	(%54.8)	5	(%38.1)	8	(%57.1)	11	(%59.5)	6	(%38.1)	8	(%57.1)
Total		42	100.0	42	100.0	42	100.0	42	100.0	42	100.0	42	100.0

*Due to the table size, only f is provided

Teachers did not consider that the school facilities and the curriculum are sufficient for gaining and practising teaching 21st century skills in a professional sense and stated that the teachers were competent. It was observed that culture course teachers more dominantly have this perception than vocational course teachers. Teachers may have considered themselves competent in acquiring and applying these skills, considering that they have trained and educated themselves in several ways. It can be asserted that the schools' physical and technical infrastructure and curriculum do not support the acquisition and application of these skills.

The vocationally sufficiency of the school facilities, teachers and curriculum for acquiring and applying 21st century learner skills

Students were also asked whether the school facilities, teachers and curriculum were sufficient for providing and practicing 21st century learner skills. The data regarding the answers are detailed in the table below.

Table 16. Sufficiency Assessment of School Facilities, Teachers and Curriculum by Students for Acquiring and Implementing 21st Century Learner skills

	To gain in the 21st century learner skills in the vocational context						To apply in the 21st century learner skills in the vocational context					
	School Facilities Sufficiency		Teachers Sufficiency		Curriculum Sufficiency		School Facilities Sufficiency		Teachers Sufficiency		Curriculum Sufficiency	
	f	%	f	%	f	%	f	%	f	%	f	%
Yes	80	29.7	142	52.8	119	44.2	86	32.0	132	49.1	109	40.5
No	169	70.3	127	47.2	150	55.8	183	68.0	137	50.9	160	59.5
Total	269	100.0	269	100.0	269	100.0	269	100.0	269	100.0	269	100.0

Students did not consider school facilities and the curriculum sufficient for gaining and applying in the 21st century learner skills in the vocational context. Moreover, students stated that teacher competence is sufficient for acquiring these skills but not enough for practice. Although the school's infrastructure, physical structure, and curriculum experienced various stages of change and development in the vocational sense while students still have deficiencies, they may not be considered

sufficient. Although the education-training programs are improved, and efforts are made to increase the school facilities, the planned changes may be hindered by the problems during implementation. Therefore, schools and curricula may also be considered insufficient by students in acquiring and applying 21st century learner skills. It can be argued that the reason behind students' perception of teachers as competent in the acquisition of these skills may be rooted in teachers' efforts to improve themselves and raise students' awareness on this issue. However, it may be that the teachers think that they are inadequate in this regard, as the reason for teachers' inadequacy in terms of students' ability to reflect these skills in practice.

The Characteristics of the 21st Century Learner According to the Teachers Working in Vocational High Schools

Some of the teachers were asked (based on volunteering), "How should the learner of the 21st century we live in your opinion?" in the form. Since the data obtained from 38 of the participating teachers were complete, relevant analyses were made. The characteristics of the teachers who answered this question are as follows:

Table 17. Frequency Distribution According to The Teacher Characteristics Regarding The Qualitative Research Question

Teachers	Vocational	Culture	Total
Female	5	4	9
Male	13	16	29
Total	18	20	**38**

The data obtained from the teachers were coded by gender, being vocational and cultural course teacher. Connotations of "T1, T2..." in coding refers to the teacher and the sequence number, the letter F to female, the letter M to male, "Voc" to vocational and "Cul" to Culture course teacher. The data were categorized according to the themes formed as "cognitive, autonomous, innovativeness, cooperation and flexibility skills" within the framework of 21st century learner characteristics. The data was coded under these themes through the scale developers' data, and the sub-skills that were thought to be included in these themes were determined by a literature review. Therefore, the scope of the determined themes has been extended in line with the literature. The findings obtained were interpreted under these themes. These findings are supported by direct quotations. The frequency distribution of the teachers according to the themes is as follows (this does not match the number of people since teachers have more than one theme-matched answers):

Table 18. Frequency Distribution of Opinions According to Themes Depending on The Teacher Characteristics

21st Century Learner Characteristics	Vocational		Culture		Total
	F	M	F	M	
Cognitive Skills	1	1	2	6	10
Autonomous Skills	2	7	2	11	22
Collaboration and Flexibility Skills	-	4	-	1	5
Innovation Skills	3	7	3	11	24
Total	6	19	7	29	61

The table reveals that teachers stated the opinion as "they should be individuals with innovation skills" on how the 21st century learner should be. It has also been observed that most male and culture course teachers defended this argument. This result can be attributed to the fact that vocational high schools' teacher capacity consists mostly of male teachers. Teachers mostly stated "information and communication technologies literacy" and "being inquisitive, active, open to new learning, innovations, change and development" regarding innovation skills. The teachers highlighted that the 21st century learner should be able to use information and communication technologies, be curious, open to

innovations and new learning, follow the innovations in every field, and be a person not in front of development and change but together with it. Some views that support this are as follows:

T3.M.Voc. "The one that researches, is not satisfied with what is thought and wants more, has hope for his future..."

T12.M.Cul. "To see learning and teaching as a hobby, be interested in the job you love, love researching, updating, and innovation."

T13.M.Voc. "Curious, benefiting from the positive aspects of information technologies to the maximum, entrepreneurial, inclined to design projects..."

T15.F.Cul. "…Using technology accurately…"

T26.F.Cul. "…must be willing to learn new things always…"

T32.F.Voc. "Must be curious, willing, motivated and open to learning new things."

T36.M.Voc. "The ability to use technology must be high. One must follow the innovations and be open to innovations. Should be able to fulfill the requirements of the profession."

T38.M.Voc. "…Must keep the mind open to change and development."

Teachers stated that among the 21st century learner characteristics, autonomous skills are the second most important quality (Table 18). This finding may be interpreted as "the 21st century learner must be individuals with autonomous skills". Moreover, the table shows that male and cultural course teachers mostly defended this argument. They mentioned "self-knowledge and progress and development in this regard, research, questioning, being creative, critical, open to communication, having empathy, being self-confident, learning to learn, being active in learning and social life, social and free, respecting personal, social and religious values and rights" regarding teachers' autonomous skills. Teachers, the 21st century learner as an individual who is aware of one's characteristics and directs, advances and develops both education and life, learns to learn, an investigative, questioning, creative, critical, empathetic and communicative person, self-confident, active, social, able to think and act freely, and also embraces the values and is respectful. Some of these opinions are listed below:

T2.M.Voc. "…Should have full confidence when asked, and answer questions without thinking about whether being wrong."

T15.F.Cul. "One with self-esteem has a goal, realize and correct and complete the shortcomings, has empathetic strength ..."

T20.M.Cul. "…They must be individuals who have learned to learn on their own."

T22.M.Cul. "…A social individual who knows, practices and respects basic religious and moral values."

T24.F.Cul. "One should be active in the education and social life... should pay attention to be organized and scheduled."

T26.M.Cul. "Creative ones with 21st century global skills, ... recognizing, knowing, applying universal human rights, a critical perspective, and open to communication..."

T27.M.Voc. "One must be able to learn, question, research, think, ask questions, and know what education should be like as a teacher."

T30.F.Voc. "…Being more respectful towards the courses and teachers, willingly study and attend classes."

T34.M.Cul. "Progressing in line with the abilities..."

Teachers also especially stated that the 21st century learner should also have cognitive skills. Male and cultural teachers expressed this opinion more than other teachers. The 21st century learner's cognitive skills include "accessing and structuring information, awareness of these processes, theconsequences, information and media literacy." The teachers describe the 21st century learner as individuals who have information and media literacy, are equipped with the knowledge that will meet the requirements of the information age. Some of the teacher opinions that support this insight are as follows:

T11.M.Cul. "Learning and being informed continuously, gaining experience and knowledge to expertise..."

T12.M.Cul. "…Must be able to renew the knowledge under new circumstances, critically approach knowledge and skills, and contribute to knowledge production…"

T15.F.Cul. "…The learner should read books, follow the news (not with the information received from social media)."

T26.M.Cul. "The 21st century learner is the person who interprets the information presented, reviews, defines and makes sense of them in a unique way…"

T33.F.Cul. "One should know what is learned and be able to apply that."

T38.F.Voc. "Should pursue information in the ever-evolving and changing information age..."

Although with a small margin, some participant teachers adopted the view that the 21st century learner "must have cooperation and flexibility skills". Since cooperation and flexibility skills are the most demanded skills in vocational courses, it is inevitable that male and vocational course teachers defended this argument more. In this context, the skills, participation and interest in the courses were created by considering these situations with other students and teachers. Collaborations and flexible behaviors exhibited in these situations were evaluated under these skills by the teachers as those were the required student characteristics. Some of the related views are provided below:

T1.M.Voc. "…Teachers should act in a way that enables a proper learning environment, and students should work in a way that employs the five senses..."

T2.M.Voc. "Should not be disrespectful towards the teacher, should not do things such as threatening, violence, etc. Must come to the lesson on time and be ready with the school materials, have the ability and knowledge to use them in a way that will helps learning…"

T3.M.Voc. "…must work tirelessly for the required professional competence."

T6.M.Voc. "Should be able to cooperate with other students..."

T35.M.Cul. "Must be an active participant by doing, living, repeating and loving the lessons."

The Characteristics of the 21st Century Teacher According to the Students Studying in Vocational High Schools

Students were asked the question of "What is your 21st century teacher ideal?" teacher ideal?" The 194 student responses were selected through volunteering and appropriateness. The student characteristics are summarized in the table below:

Table 19. Frequency Distribution According to The Student Characteristics Regarding The Qualitative Research Question

The Study Fields	Female	Male	Total
Accounting and Finance	8	29	37
Marketing and Retail	3	17	20
Information Technology	13	9	22
Justice	12	6	18
Electrical-Electronics Technology	-	42	42
Machine Technology	-	8	8
Health Services	29	18	47
Total	65	129	194

Students' data was primarily coded. This coding used connotations as "S1.F., S2.M.,…". This visual includes the students, their student id and gender (F: Female, M: Male), respectively. Student views were classified under the themes, created in line with the characteristics of the 21st century teacher, such as "administrative, technopedagogical, affirmative, flexible teaching, and productive skills". Some of the skills to be included in these themes (as in the classification of teachers' qualitative data) were selected through the literature review. The classification of student views was adjusted accordingly, and the frequency distribution by the themes is available in Table 20. Necessary findings and interpretations are provided under these themes. Moreover, these findings were supported by direct quotations from student expressions.

Table 20. Frequency Distribution of Student Views by Themes

21st Century Teacher Characteristics	f
Administrative Skills	118
Technopedagogical Skills	9
Affirmative Skills	102
Flexible Teaching Skills	12
Productive Skills	8
Total	249

Table 20 revealed that the students stated they mostly wanted teachers with administrative, affirmative, flexible teaching, technopedagogical and productive skills, respectively. It can be concluded that vocational high school students claimed a "21st century teacher should have these features." Moreover, it can be deduced that vocational high school students think their teachers are inadequate regarding these characteristics.

The students argued that the most significant skill regarding "How a 21st century teacher should be?" were administrative skills. Based on the student opinions, it can be said that teachers are incompetent in these features, and they think these are more important than anything else. Besides the "classroom, process and activity management", "self-management skills, teacher-student interaction, communication, cooperation, personal and professional characteristics" are also included in the teachers' administrative skills. It is observed that the vocational high school students stated that they especially wanted their teachers to have these qualities. Some related student views are as follows:

S3.M. "Should teach lessons with a quality, the teaching should be sufficient ..."

S4.M. "Must be sensitive, tolerant, calm, knowledgeable, an expert on the topic, smiling, disciplined. Also must be young, beautiful and dynamic."

S17.M. "Should not bore the students in the lesson, should interact with the students. The student should be guided to the field where s/he is successful ..."

S28.E. "Proceeding clearly and practically in the lessons..."

S33.M. "Must be knowledgeable, humorous, and tolerant and use accurate Turkish."

S36.F. "I think a teacher should have rules about oneself and should raise the awareness of students properly according to these rules ..."

S38.E. "Must be able to perform the lesson and express oneself. Should be more energetic, able to make us enjoy the lesson."

S158.K. "Should guide. Should not try to force things into our head although we cannot understand them by force. Today's teachers try to fill a glass with water with a fire hose. Neither the glass is filled, nor is the water useful for anything. Both the teacher and the education system must transform themselves. We are not horse racing. We cannot spare time for ourselves."

S159.F. "The most expected thing from a teacher is reliability. The most important factors are the students' ability to understand the language, be friendly with their students, and communicate well. The teacher and the student should both be prepared when starting a lesson. Every teacher has to read and research."

S166.M. "Should explain the subject that is desired to be thought to the students in an explanatory and clear manner. Should be friendly to students. The lesson should be taught fluently, that is, a narration that encourages students to listen. Should warn about the negative acts of the students calmly, not with anger. "

S177.K. "The 21st century teacher should convey what is acknowledged. We want a teacher who focuses on the subjects that the student does struggle to understand, does not set limits on questions that are related to new subjects, is tolerant, does not always make quizzes…, does not get tired and do love the students."

Vocational high school students especially stated that the 21st century teacher should have affirmative skills. They have mentioned that "respecting the learner behaviors, differences and rights, taking them into account, approving and using reinforcements to ensure the continuity of correct behaviors" regarding teachers' affirmative skills. It is observed that students expect teachers to demonstrate these features. Here are some of the student views while expressing the teacher they want:

S21.M. "Must be fair, should not discriminate, should not like one student more than another, and should treat equally."

S36.F. "…They should be moderate towards their students, tolerant and ask their opinions on issues that concern students".

S41.F. "Should not scorn and despise students. Should provide us with good intentions and self-confidence rather than education."

S64.F. "Should not violate the student's rights."

S156.F. "I think the teachers of the present century should be loving, compassionate towards students. They should listen to the students before getting angry with anything. "

S164.F. "First of all, the importance and appreciation of students substantially affect the students..."

S192.F. "…Should respect and consider my feelings and thoughts. Should be able to see the light in the student. Should not scold or humiliate the student in public."

Students also stated that their teachers should have flexible teacher skills. It can be concluded that the 21st century teacher is an "individual who can perform teaching with activities and practices independent of the classroom, which is within the scope of flexible teacher skills." Some reference comments are as follows:

S74.M. "It should not only about classes. They should do extracurricular activities. Should not bore the students."

S89.F. "…They should have lots of activities done. They should encourage us to the lesson."

S94.M. "They should teach life before class."

S150.M. "…Social activity should be given importance and applied to provide efficiency in the lessons."

Technopedagogical skills, which are among the 21st century teacher characteristics, take the last place among students' opinions. It was stated that teachers were asked to have these skills. However, since numerous teachers categorically have these skills in line with their profession, it can be thought that students see their teachers as relatively adequate for these skills. This skill includes blending technology, pedagogy, being open to innovations and reflecting on teaching. Some student views are:

S66.M. "They must be able to use the technologies of the developing age, be good and skillful in its field, use laboratories and workshops in a qualified manner..."

S73.F. "They must follow technology closely and have advanced knowledge."

S122.M. "…Internet is in our lives now, teachers should make use of it."

S152.M. "…They should reinforce with things such as video etc., for the lesson to be understood by all students."

S173.M. "…Must keep up with innovations, and they should also change with innovations."

Productive skills, encompassing the enrichment of teaching with new, different materials and practices, as mentioned by the students among the features that should be present in the 21st century teacher characteristics. It can be thought as "Teachers should have these characteristics". However, the vast majority of students must have thought that teachers were also sufficient in these skills, as it was mentioned less. Some of the student views are listed below:

S42.F. "Lessons can be taught from other sources in the course."

S116.M. "After giving the main point of the subject, they should show the next generation questions."

S122.M. "Making use of materials…"

S123.M. "…They should use the tools more conveniently in the lesson."

S185.F. "Applications should be promoted in the lessons."

Conclusion, Discussion and Suggestions

Since it is one of the main objectives of vocational education institutions to raise qualified labor force for the labor market, the students must be equipped with 21st century skills. It is up to both institutions and teachers to achieve this. It is important that the skills are internalized and reflected in education and training processes.

The teacher qualifications, changes in teacher education, work or school-based character of education, curriculum authenticity, access to higher education, and student choices to vocational education, gender differences and other inequalities, economic and administrative changes are discussed in the analysis of vocational education and training (CEDEFOP, 2020).

Vocational high school teachers and students usually used 21st century teaching and learner skills. Thus, the efficiency of teachers' education-training processes and the students' learning quality are expected to be high. It is evident that teachers have enriched the teaching process with these skills, facilitating learning and providing students with various features as the students use the 21st century learner skills. Teachers' and students' utilization and competence in 21st century teaching and learner skills are interconnected as they will affect each other's development (Sanders & Rivers, 1996). The 21st century student profile and teacher profile overlap exactly (EARGED, 2011). Moreover, it was determined that teachers used flexible teacher skills less than other skills as they used the other skills such as affirmative, administrative, technopedagogical and productive skills. It was observed that students reflected cognitive and innovative skills to the learning process more than autonomous, cooperation and flexibility skills in their vocational education. Previous studies on teachers (Eğmir & Çengelci, 2020; Gürültü et al., 2018, 2020; Kıyasoğlu & Çeviker Ay, 2020; Kozikoğlu & Özcanlı, 2020; Uyar & Çiçek, 2021; Yalçın İncik, 2020) and students (Zeybek, 2019) have reached similar results. Furthermore, Gürültü et al. (2020) found that vocational and technical Anatolian high school teachers exhibit affirmative skills more than teachers working in other institutions. According to the EARGED (2001) data, teachers found themselves very competent in "mastering the subject area, student development, planning teaching, teaching strategies, scientific processing skills, classroom management and activities, vocational development, personal characteristics, social and environmental dimensions".

There was no significant difference found between the 21st century teacher skills usage and variables of gender, teaching field type, age, length of service and graduated faculty. It was concluded that vocational high school teachers usually used 21st century teacher skills regardless of the research variables during the teaching process in the classroom environment. These results suggest that teachers are subject to individual or institutional training regarding the competence to acquire and use these skills in education and later in professional life. The Presidency of Higher Education (YÖK) and the Ministry of National Education (MoNE) organize programs and infrastructures to train individuals suitable for the profile required by the 21st century. It coincides with the results of many studies that concluded teacher skills are not significantly correlated with gender (Eğmir & Çengelci, 2020; Gürültü et al., 2020; Kıyasoğlu & Çeviker Ay, 2020; Kozikoğlu & Özcanlı, 2020; Uyar & Çiçek, 2021; Yalçın İncik, 2020), age (Kıyasoğlu & Çeviker Ay, 2020), term of service (Gürültü et al., 2018, 2020; Kıyasoğlu & Çeviker Ay, 2020; Uyar & Çiçek, 2021; Yalçın İncik, 2020) and the graduated faculty (Gürültü et al., 2018; Kıyasoğlu & Çeviker Ay, 2020). Cemaloğlu et al. (2019) found significant differences by gender and term of service in their study on the vocational high school teachers' 21st century skills and self-efficacy perceptions. Gürültü et al. (2018) found significant differences by gender, Eğmir and Çengelci (2020), Kozikoğlu and Özcanlı (2020) term of service, Gürültü et al. (2020) graduated faculty variable. Kozikoğlu and Özcanlı (2020) found a significant difference in vocational course teachers' favour between vocational courses teachers, Mathematics and Science teachers.

There is a significant difference between students' usage of 21st century skills and the variables of gender and maternal education, while there is no significant difference by education area, paternal education level and family income level. Female students had higher 21st century learner skills than

male students, students with maternal education level of secondary school and high school had and used more than the others. It was determined that the use of the 21st century learner skills was average and above despite the differences in students' occupational fields, paternal education and family income level. Students' need to succeed in a rapidly changing global environment requires the development of 21st century skills (Bunker, 2012). Zeybek (2019) found no significant correlation between students' use of 21st century learner skills and the family income level. However, it particularly emphasized that the use of skills decreased with a low level of income.

Despite the differences between students and teachers by the variables, it was observed that the use of 21st century learner and teacher skills is at levels that can be considered positive. These results can be considered as a reflection of the changes made by the MoNE and PHE in these areas.

It is stated that the rapid adoption and widespread use of digital technologies affect compliance with innovation (Avcı, 2020; Demir, 2006; Hoerup, 2001; Mao, 2001), as the perceived characteristics of innovation, /relative advantage, suitability, complexity, testability, and observation -levels are effective in an individual's decision to adapt (Rogers, 1995). As individuals see the innovation as more advantageous, convenient, testable and easy, it increases the speed of adaptation to the innovation, which shapes their attitudes (Demir, 2006; Tosuntaş & Çubukçu, 2019). These skills have developed very well with the teachers' positive attitudes and students due to their high adaptation rate to innovation. Therefore, teachers and students also have these skills at a sufficient level. Moreover, the smooth adaptation process is an indicator of the development of existing knowledge, skills and abilities (Kılıç, 2015).

Students in vocational high schools primarily used the internet to gain information. Besides, they mostly refer to friends, family, teachers, libraries/books, experts (a small ratio), they do not get any help from anyone, and they consult other sources. Since these students are digital natives (Prensky, 2001), and it is known that digital natives mostly communicate with their friends, families, teachers, coaches and advisors (Palfrey & Gasser, 2008), it is expected from them to apply to these people after the internet for information.

Teachers did not consider that the school facilities and the curriculum are sufficient for gaining and practising teaching 21st century skills in a professional sense as they perceived themselves as competent. In these views, culture course teachers are more prominent than vocational course teachers. Students also did not consider school facilities and the curriculum sufficient for gaining and applying the 21st century learner skills in the professional context. Moreover, students considered the teacher competence sufficient for acquiring the 21st century learner skills as they did not have the same opinion for practice. These results show that schools' educational programs and innovation efforts are not sufficient in terms of ensuring 21st century learner and teacher skills and reflecting them into practice. Transforming schools into a form that can fulfill the requirements of the 21st century and transforming them into learning and active schools will play an effective role in reaching the goals (Eğmir & Çengelci, 2020). In a study in which the 21st century skills self-efficacy perceptions of vocational high school teachers were researched, it was determined that teachers perceived themselves at a high level (Cemaloğlu et al., 2019). Teachers' competence in these skills may have been developed through their own personal initiatives and in-service training. It is known that these skills of teachers who receive in-service training are high (Uyar & Çiçek, 2021). It was especially emphasized by students as stakeholders of the learning process that teachers were inadequate in terms of their ability to make students apply their 21st century learner skills.

The rapid change in science and technology has caused the qualities needed in individuals to change (Hamarat, 2019). Innovative skills stand out in the qualitative findings regarding teachers' definition of a "21st century learner". Then come autonomous, cognitive, and collaboration and flexibility skills. These views are mostly advocated by male teachers who attend culture lessons. It can be concluded that the 21st century learners should be individuals who show the following skills respectively "innovativeness (information and communication technology literacy, being curious, being

active, being open to new learning, innovations, change and development), autonomous (self-knowledge and progress and development in that direction, research, questioning, being creative, being critical, being open to communication, being empathic, self-confident, learning to learn, being active in learning and social life, being social and free, knowing and respecting personal, social and religious values and rights), cognitive (being information and media literate), cooperation and flexibility (class participation and interest, cooperation with other students and teachers, and flexible behavior). Teachers emphasized that the 21st century learner should be primarily innovative and then individuals with more autonomous skills. This result coincides with the research on "students' use of 21st century learner skills". Teachers emphasized that students should have innovativeness and autonomous skills, but they stated that the level of use of these skills in students is not in the first place. Accordingly, it can be concluded that teachers analyze their students well and know them well. Learner analysis is essential in designing a teaching process (Gagné, Briggs, & Wager, 1992). The "ideal student" of teachers is self-confident, devoted to national moral values, with a sense of responsibility, hardworking, respectful, altruistic, honest, courageously defending their beliefs, researching, questioning, communicating, open to criticism, and social (Avcı & Durmuşçelebi, 2014). Since it is the individual who is responsible for shaping the educational life, teachers desire to raise individuals who have autonomous skills, that is, who controls the content and process of learning themselves (Tok, 2011). Besides, it can be said that this skill is not at the desired level due to the correlation between the income levels of the students' families and their innovation skills (Zeybek, 2019).

Students' definition of "21st century teacher" highlights administrative skills as the central component. Then come the affirmative, flexible teaching, technopedagogical and productive skills, respectively. Almost all of the students want their teachers to be equipped with the following skills; administrative (classroom management, process and activity management, self-management skills, teacher-student interaction, communication, cooperation, personal and professional characteristics), approving (respecting and taking into account learner behaviors, differences and rights, approval of correct behaviors and using reinforcements to ensure sustainability). The features, which are considered important for 21st century learning such as technopedagogical (blending technology, pedagogy, being open to innovations and reflecting on teaching), productive (enriching teaching with new, different materials and practices) and flexible teaching (carrying out activities and practices independent of the classroom) skills, are not quite visible for vocational high school students. Students see their teachers as inadequate in these matters, and therefore they want them to have these skills. The teacher of the 21st century mentioned by the students within the research scope is in line with the "Contemporary Teacher Profile" of EARGED (2001). A qualified teacher's skills have been gathered around personal and professional characteristics, professional development and competencies, and communication and classroom management skills (Mızrak Karcı, 2016; Taşkaya, 2012). Teachers' sufficiency in technopedagogical skills is an essential requirement for 21st century teaching characteristics (Garba, Byabazaire, & Busthami, 2015). Eğmir and Çengelci (2020) stated that flexible teaching and productive skills and Gürültü et al. (2020) found that flexible teacher skills were used less compared to other skills. This confirms the student opinions. Moreover, Mızrak Karcı (2016) emphasized that vocational and technical high school students summarize the ideal teacher qualifications around personality, general teaching methods, assessment-evaluation and interpersonal communication characteristics and the necessity of these characteristics.

Despite these student views, teachers see themselves competent in affirmative, administrative, technopedagogical, productive and flexible teacher skills. However, this is supported by another result: teachers do not consider school facilities and curriculum sufficient for gaining and practicing teacher skills. These results show that teachers do not fully reflect the characteristics they think they have to the students due to the inadequacy of school facilities and curriculum, and students think that their teachers do not have these qualities sufficiently due to these reasons. These results revealed that many situations are interrelated. Besides, the reasons for the differences in student and teacher opinion are the different meanings attributed to terms by individuals, teachers' inability to express themselves, to exhibit their

competence, differences in teacher expectations of students, lack of communication, and dialogue disorders (EARGED, 2001).

Suggestions

Teachers themselves should make an effort to train themselves so that the 21st century teachers should be and reflect these. Teachers do not see the school facilities and curriculum as sufficient for acquiring and practicing teaching and learner skills by teachers and learners. However, with the emergence of teachers' inadequacy in reflecting students' learner skills into practice, more emphasis should be applied to developing these skills. Activities on these topics can be increased in on-the-job training. Besides, teacher training institutions should include these applications in their teaching practices and undergraduate courses.

It should be ensured that teachers and students learn to train themselves in a way that is open to innovation and change. Teachers and students should be gain awareness regarding teaching and learning shall not be limited to the classroom. It should be emphasized that learning takes place everywhere and under all conditions. The awareness that we are in a lifelong learning process should be gained. Raising individuals who can direct their education should be the goal of teachers. Institutions and programs that will meet the need for updating the skills of teachers who provide vocational education services should step in immediately. It should be the priority of teachers to train individuals demanded by the business world, qualified, responsible, determined, educated, open to innovations, adaptable to changes, well adjusted, creative, active, competent in communication skills, self-regulated, free and have corporate involvement. Teachers should conduct educational activities with a multi-faceted perspective that will ensure their development, increase their qualifications and values, and include students in the learning-teaching process, without treating their students as objects in the process and considering that they are individuals. Information and communication technologies literacy levels should be increased. Teachers' pedagogical knowledge and skills should be evolved with innovative strategies in global classrooms to train students who can compete in the global market.

The study was carried out in vocational high schools. It is recommended that other researchers and practitioners conduct different studies by providing sample size and variation and further differentiation of variables. By comparing the teaching and learning skills with vocational and other high schools separately or together, similarities and differences can be revealed. Comparative analyzes can be made by differentiating and expanding the independent variables within the scope of the study.

References

American Association of School Librarians. (2009). *Standards for the 21st century learner in action.* Chicago: American Association of School Librarians. Retrieved from https://www.epsnj.org/site/handlers/filedownload.ashx?moduleinstanceid=7770&dataid=32216&FileName=AASL%2021ST%20C%20learner.pdf

Assessment and Teaching of 21st Century Skills. (2012). About the project. Retrieved from http://www.atc21s.org/

Avcı, A. (2020). Müzik eğitiminin yeni yüzü: Dijital teknopedagojik müzik (DiTeM) eğitimi. *Turkish Studies-Applied Sciences, 15*(3), 269-288. doi:10.47844/TurkishStudies.45433

Avcı, Ö. Y., & Durmuşçelebi, M. (2014). Öğretmen görüşlerine göre ideal öğrenci tipi. *OPUS-Türkiye Sosyal Politika ve Çalışma Hayatı Araştırmaları Dergisi, 4*(6), 22-44.

Aydemir, H., Karalı, Y., & Coşanay, G. (2020). Sosyal Bilgiler öğretmen adaylarının 21. yüzyıl öğreten ve öğrenen becerilerinin incelenmesi. *USBAD Uluslararası Sosyal Bilimler Akademi Dergisi, 2*(4), 1199-1214.

Balcı, A. (2009). *Sosyal bilimlerde araştırma yöntem, teknik ve ilkeleri* (7th ed.). Ankara: Pegem Akademi Publishing.

Binkley, M., Erstad, O., Herman, J., Raizen, S., Ripley, M., & Rumble, M. (2010). *Defining 21st century skills.* White Paper commissioned for the Assessment and Teaching of 21st Century Skills Project (ATC21S). Melbourne, Australia: Assessment and Teaching of 21st Century Skills. Retrieved from https://www.intel.com.tr/content/dam/www/public/emea/tr/tr/pdf/education/tools-and-resources/century21-skills-report.pdf

Bunker, D. H. (2012). *Teachers' orientation to teaching and their perceived readiness for 21st century learners* (Doctoral dissertation). The University of Texas at Arlington, Arlington.

Büyüköztürk, Ş. (2013). *Sosyal bilimler için veri analizi el kitabı istatistik, araştırma deseni SPSS uygulamaları ve yorum* (18th ed.). Ankara: Pegem Akademi Publishing.

Büyüköztürk, Ş., Kılıç Çakmak, E., Akgün, Ö. E., Karadeniz, Ş., & Demirel, F. (2016). *Bilimsel araştırma yöntemleri* (21th ed.). Ankara: Pegem Akademi Yayıncılık.

Can, A. (2016). *SPSS ile bilimsel araştırma sürecinde nicel veri analizi* (4th ed.). Ankara: Pegem Akademi Publishing.

Care, E., & Kim, H. (2018). Assessment of twenty-first century skills: The issue of authenticity. In E. Care, P., Griffin, & M. Wilson (Eds.), *Assessment and teaching of 21st century skills: Research and applications* (pp. 21-39). Switzerland: Springer International Publishing.

Cemaloğlu, N., Arslangilay, A. S., Üstündağ, M. T., & Bilasa, P. (2019). 21st century skills self-efficacy perceptions of vocational high school teachers. *Ahi Evran University Journal of Kırşehir Education Faculty, 20*(2), 845-874.

Certel, Z., Bahadır, Z., & Topuz, R. (2019). The role of 21st century learner skills of physical education and sports teachers and teacher candidates on teacher skills. *Turkish Journal of Sport and Exercise, 21*(2), 395-402.

Coursera. (2020). Global skills index 2020. Retrieved from http://www.sertacdoganay.com/wp-content/uploads/Coursera-Global-Skills-Index-2020.pdf

Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (4th ed.). Boston, USA: Pearson Education.

De Vaus, D. A. (2002). *Surveys in social research* (5th ed.). London: Routledge Taylor & Francis Group.

Demir, K. (2006). Rogers'ın yeniliğin yayılması teorisi ve internetten ders kaydı. *Kuram ve Uygulamada Eğitim Yönetimi*, 47, 367-392.

Education Research and Development Department. (2001). *21. yüzyıla girerken türk eğitim sisteminin ihtiyaç duyduğu çağdaş öğretmen profili.* Ankara: MEB Basımevi.

Education Research and Development Department. (2011). *MEB 21. yüzyıl öğrenci profili.* Ankara: MEB EARGED. Retrieved from https://www.meb.gov.tr/earged/earged/21.%20yy_og_pro.pdf

Eğmir, E., & Çengelci, S. (2020). Öğretmenlerin 21. yüzyıl öğretim becerilerinin yansıtıcı düşünmeyi uygulama becerilerini yordama gücü. *Tarih Okulu Dergisi, 13*(45), 1045-1077.

Erten, P. (2018). Öğretmenlerin "Öğretmenlik mesleği genel tutum ve değerler kapsamında kişisel ve mesleki gelişim yeterlikleri" açısından değerlendirilmesi In *Proceedings of International Learning Teaching and Educational Research Congress* (pp. 492-496). Amasya: Amasya University.

Erten, P. (2020). Öğretmen adaylarının 21. yüzyıl becerileri yeterlilik algıları ve bu becerilerin kazandırılmasına yönelik görüşleri. *Milli Eğitim Dergisi, 49*(227), 33-64.

European Center for the Development of Vocational Training. (2020). *Vocational education and training in Europe, 1995-2035: Scenarios for European vocational education and training in the 21st century.* Luxembourg: Publications Office of the European Union. Retrieved from http://data.europa.eu/doi/10.2801/794471

Gagné, R. M., Briggs, L. J., & Wager, W. W. (1992). *Principles of instructional design* (4th ed.). USA: Harcourt Brace College Publishers.

Garba, S. A., Byabazaire, Y., & Busthami, A. H. (2015). Toward the use of 21st century teaching-learning approaches: The trend of development in Malaysian schools within the context of Asia Pacific. *International Journal of Emerging Technologies in Learning, 10*(4), 72-29.

Geisinger, K. F. (2016). 21st century skills: What are they and how do we assess them?. *Applied Measurement in Education, 29*(4), 245–249. doi:10.1080/08957347.2016.1209207

General Directorate of Vocational and Technical Education. (2019). Retrieved from http://mtegm.meb.gov.tr/

Good, D. G. (1999). *Future trends affecting education.* Denver, CO: Education Commission of the States Distribution Center.

Gültekin, M. (2014). Dünyada ve Türkiye'de ilköğretim programlarındaki yönelimler. *İlköğretim Online, 13*(3), 726-745.

Gümüş, A. (2019). *Geleceğin eğitiminde yeni öğretmen becerileri* (Analiz Raporu: 2019/04). İstanbul: İLKE İlim Kültür Eğitim Vakfı.

Gürültü, E., Aslan, M., & Alcı, B. (2018). İlköğretim öğretmenlerinin yeterliklerinin 21. yüzyıl becerileri ışığında incelenmesi. *Akademik Sosyal Araştırmalar Dergisi, 6*(71), 543-560. doi:10.16992/ASOS.13770

Gürültü, E., Aslan, M., & Alcı, B. (2020). Ortaöğretim öğretmenlerinin 21. yüzyıl becerileri kullanım yeterlikleri. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 35*(4), 780-798. doi:10.16986/HUJE.2019051590

Hamarat, E. (2019). *21. yüzyıl becerileri odağında Türkiye'nin eğitim politikaları.* Ankara: SETA Yayınları.

Hoerup, S. L. (2001). *Diffusion of an innovation: Computer technology integration and the role of collaboration* (Doctoral dissertation). Faculty of the Virginia Polytechnic Institute and State University, Blacksburg, Virginia.

International Society for Technology in Education. (2021). *ISTE standarts for educators.* Retrieved from https://www.iste.org/standards/for-educators

Kaptan, S. (1998). *Bilimsel araştırma ve istatistik teknikleri.* Ankara: Tekışık Web Ofset Tesisleri.

Karasar, N. (2003). *Bilimsel araştırma yöntemi* (12th ed.). Ankara: Nobel Yayın Dağıtım.

Kılıç, H. (2015). *İlköğretim branş öğretmenlerinin bireysel yenilikçilik düzeyleri ve yaşam boyu öğrenme eğilimleri (Denizli ili örneği)* (Unpublished master's thesis). Pamukkale University, Denizli.

Kıyasoğlu, E., & Çeviker Ay, Ş. (2020). Sınıf öğretmenlerinin 21. yüzyıl öğrenen ve öğreten becerilerini kullanma düzeylerine ilişkin görüşleri nelerdir?. *e-Kafkas Eğitim Araştırmaları Dergisi, 7*(3), 240-261. doi:10.30900/kafkasegt.689976

Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge?. *Contemporary Issues in Technology and Teacher Education, 9*(1), 60-70.

Kozikoğlu, İ., & Özcanlı, N. (2020). Öğretmenlerin 21. yüzyıl öğreten becerileri ile mesleğe adanmışlıkları arasındaki ilişki. *Cumhuriyet International Journal of Education, 9*(1), 270-290. doi:10.30703/cije.579925

Köğce, D., Özpınar, İ., Mandacı Şahin, S., & Aydoğan Yenmez, A. (2014). Öğretim elemanlarının 21. yüzyıl öğrenen standartları ve yaşam boyu öğrenmeye ilişkin görüşleri. *Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi, 22,* 185-213.

Lemke, C., Coughlin, E., Thadani, V., & Martin, C. (2003). *enGauge 21st century skills: Literacy in the digital age.* USA: NCREL and METIRI Group. Retrieved from https://www.researchgate.net/publication/234731444_enGauge_21st_Century_Skills_Digital_Literacies_for_a_Digital_Age

Lemov, D. (2010). *Teach like a champion: 49 techniques that put students on the path to college (K-12).* USA: John Wiley & Sons.

Mahiroğlu, A. (2019). Mesleki ve teknik eğitim ve istihdam. In F. Tanhan (Ed.), *Türkiye eğitim vizyonu üzerine değerlendirmeler* (pp. 105-114). Ankara: Pegem Akademi Publishing.

Mao, E. (2001). *Organizational use and diffusion of information technology in China and an International comparative assessment* (Doctoral dissertation). The University of Memphis, Memphis.

Mızrak Karcı, M. (2016). Öğrenci gözüyle ideal öğretmenin özellikleri: Gazi mesleki ve teknik Anadolu lisesi örneği. *Milli Eğitim Dergisi, 45*(209), 80-101.

Ministry of National Education. (2017). *Öğretmenlik mesleği genel yeterlikleri.* Ankara: Öğretmen Yetiştirme ve Geliştirme Genel Müdürlüğü.

Oblinger, D. G., & Oblinger, J. L. (2005). Is it age or IT: First steps toward understanding the net generation. In D. G. Oblinger & J. L. Oblinger (Eds.), *Educating the net generation* (pp. 2.1-2.20). USA: EDUCAUSE. Retrieved from https://www.educause.edu/ir/library/pdf/pub7101.pdf

Orhan Göksün, D. (2016). *Öğretmen adaylarının 21. yy. öğrenen becerileri ve 21. yy. öğreten becerileri arasındaki ilişki.* (Unpublished doctoral dissertation). Anadolu Üniversitesi, Eskişehir.

Orhan Göksün, D., & Kurt, A. A. (2017). The relationship between pre-service teachers' use of 21st century learner skills and 21st century teacher skills. *Education and Science, 42*(190), 107-130.

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

Partnership for 21st Century Learning. (2019). *Framework for 21st century learning.* Retrieved from http://static.battelleforkids.org/documents/p21/P21_Framework_Brief.pdf

Pedró, F. (2006). *The new millennium learners: Challenging our views on ICT and learning.* Retrieved from http://www.oecd.org/edu/ceri/38358359.pdf

Peker, B. (2019). *Sosyal bilgiler öğretmen adaylarının 21.yüzyıl öğrenen becerilerini kullanım düzeylerinin incelenmesi* (Unpublished master's thesis). Niğde Ömer Halisdemir University, Niğde.

Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon, 9*(5), 1-6.

Rogers, E. M. (1995). *Diffusion of innovations* (4th ed.). New York: The Free Press.

Sanders, W. L., & Rivers, J. C. (1996). *Cumulative and residual effects of teachers on future student academic achievement.* Retrieved from https://www.beteronderwijsnederland.nl/files/cumulative%20and%20residual%20effects%20of%20teachers.pdf

Sayın, Z., & Seferoğlu, S. S. (2016). *Yeni bir 21. yüzyıl becerisi olarak kodlama eğitimi ve kodlamanın eğitim politikalarına etkisi*. XVIII. Akademik Bilişim Konferansı, Adnan Menderes University, Aydın.

Sönmez, V., & Alacapınar, F. G. (2016). *Örneklendirilmiş bilimsel araştırma yöntemleri* (4th ed.). Ankara: Anı Publishing.

Stevenson, K. R. (2010). *Educational trends shaping school planning, desing, construction, funding and operation.* Washington, USA: National Institute of Building Sciences. Retrieved from https://files.eric.ed.gov/fulltext/ED539457.pdf

Taşkaya, S. M. (2012). Nitelikli bir öğretmende bulunması gereken özelliklerin öğretmen adaylarının görüşlerine göre incelenmesi. *Erciyes Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *33*(2), 283-298.

Tok, H. (2011). Otonom öğrenme. *Elektronik Sosyal Bilimler Dergisi, 10*(36), 54-64.

Tosuntaş, Ş., & Çubukçu, Z. (2019). Yeniliklerin yayılması teorisi bağlamında öğretmen adaylarının bulut teknolojisi kullanımlarını etkileyen faktörler. *Eskişehir Osmangazi Üniversitesi Sosyal Bilimler Dergisi, 20,* 957-976. doi:10.17494/ogusbd.555091

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

Türk Eğitim Derneği. (2009). *Öğretmen yeterlilikleri.* Ankara: Adım Okan Printing Publishing.

Türnüklü, A. (2000). Eğitimbilim araştırmalarında etkin olarak kullanılabilecek nitel bir araştırma tekniği: Görüşme. *Kuram ve Uygulamada Eğitim Yönetimi Dergisi, 6*(4), 543-559.

Uyar, A., & Çiçek, B. (2021). Farklı branşlardaki öğretmenlerin 21. yüzyıl becerileri. *IBAD Sosyal Bilimler Dergisi, 9*, 1-11.

Wagner, T. (2008). *The global achievement gap: Why even our best schools don't teach the new survival skills our children need – and what we can do about it.* New York, NY: Basic Books.

Yalçın İncik, E. (2020). Öğretmenlerin yaşam boyu öğrenme eğilimleri ve 21. yüzyıl öğreten becerileri arasındaki ilişkinin incelenmesi. *Bolu Abant Izzet Baysal University Journal of Faculty Education, 20*(2), 1099-1112.

Yıldırım, A., & Şimşek, H. (2011). *Sosyal bilimlerde nitel araştırma yöntemleri* (8th ed.). Ankara: Seçkin Publishing.

Zeybek, G. (2019). Lise öğrencilerinin 21. Yüzyıl öğrenme becerileri kullanım düzeylerinin belirlenmesi. *International Journal of Social Sciences and Education Research, 5*(2), 142-156. doi:10.24289/ijsser.505263