

Investigation of 21st Century Teaching Skill Levels of Classroom Teachers

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Abstract

Many dramatic changes have been observed in the quality and quantity of knowledge and skills, as well as in the form of access to and transfer of information in the 21st century. It is important to identify the skill levels of the classroom teachers who are responsible for educational activities in primary schools for maintaining an effective educational process. The aim of this study is to examine the classroom teachers' 21st century skills in terms of various variables. An explanatory sequential pattern of mixed research methods was used in the study. The quantitative data of the study were collected from 268 classroom teachers determined by convenience sampling method, and the qualitative data were collected from 20 classroom teachers determined by maximum sampling method. The quantitative data of the study were collected using the 21st Century Teaching Skills Scale developed by Orhan-Göksün (2016) and the qualitative data were collected through an interview form prepared by the researchers consisting of seven questions. The quantitative data were evaluated by descriptive statistics, Mann-Whitney U-Test and Kruskal Wallis H-test using SPSS 22 program. The qualitative data were analyzed by the content analysis method using Nvivo 11 program. The quantitative findings of the study revealed that the participants "generally" benefited from the 21st century teaching skills in the classroom. It was also found that they used confirmatory teaching skills at the most and flexible teaching skills at the least in the sub-dimensions of the scale. The results of the study showed that the 21st century skills of classroom teachers do not differ significantly in terms of age, gender, seniority in the profession and educational level. However, there were significant differences in terms of gender in the flexible teaching sub-dimension; in terms of age and seniority in the profession in technopedagogical and consenting skills sub-dimensions. The qualitative findings of the study revealed that the classroom teachers often reinforced the positive behaviors of their students, made the necessary work to ensure that students respect individual differences, kept observation records about the basic skills of their students, determine the classroom rules together with their students, prepared worksheets and authentic materials, used technological devices to enrich teaching and organized educational and social activities for students.

Keywords: 21st Century Teaching Skills, Classroom Teachers, Teacher Competencies.

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INTRODUCTION

The 21st century has brought about numerous changes and innovations in health, industry, economy, social life and especially in education along with new approaches and different perspectives. Teachers were deemed as a source of information when the internet was not common and even accessing to the library and books was limited. However, following the rapid development of technology, it is possible to access all kinds of information online, and the role of the teacher in the teaching process is irrevocably changed. In this new educational approach, the teacher plays the role of a guide or a mediator who encourages the student to learn, reach different sources of information, help the student with the newly learned knowledge and to use it in daily life.

In the past, students were considered as *tabula rasa* to record and process knowledge. In addition, each student was assumed to be the same and a single-level teaching was conducted without reckoning individual differences. The school was almost the only place where education was provided. The process of education was thought to take place as an activity of people coming to school at certain age intervals (Öğretir Özçelik and Eke, 2020, p.233). However, in the 2023 Educational Visionary Document, it was emphasized that education could be realized in the 21st century not only in the school but also in the class, home, media, street and everywhere else, and that every individual in the society should make learning a lifestyle (MEB, 2018, p.24). In short, with the rise of new educational approach in the 21st century, education was emancipated from school buildings, engendering the concept of “education everywhere”. It was also freed from certain age intervals, giving birth to the concept of “lifelong learning”.

Advancements in nanotechnology, artificial intelligence, robotic technologies and genetics will lead to a wide range of socio-economic, geopolitical and demographic changes in the near future. Therefore, needs for some professions will increase while some will face extinction. It is estimated that approximately 65 % of the children who are currently attending to primary school will work in professions that do not exist at the moment (WEF, 2016). Hence, it is crucial to adapt to such important changes that are expected to occur soon and to educate and equip the students with appropriate skills for the countries in the future. In order to raise individuals in accordance with the developments and innovations in the 21st century, it is necessary to know the requirements of the 21st century teaching skills and to have these skills.

As a result of the innovations occurring in the 21st century, sometimes called as information age, curriculums and qualifications of the teachers who apply these programs have been changed and redefined. The most important reason that is effective in changing the teacher qualifications is that the qualities of learners have also undergone changes. For this reason, it has been reported that teachers should be re-trained in accordance with the newly formed learning qualities and that teachers working in the existing system should improve their skills and capabilities (Taşgın, 2020, p.207).

Pedagogy, curriculum, class rules and school climate are key factors in the development and monitoring of 21st century skills. The class is the primary environment in which knowledge is acquired and skills are developed and increased at the largest extent. In addition, the class is a place where students observe that these skills are modeled by their teachers and they can practise these skills by themselves. For this reason, it is essential that teachers are well-prepared for teaching the 21st century skills and the dissemination of these skills (Kim, Raza and Seidman, 2019, p.110). The success of the teachers and the quality of their education depends on many factors. The 21st century teaching skills can be expressed as one of these factors (Kozikoğlu and Özcanlı, 2020, p.271). It should be ensured that the teachers are prepared for the 21st century understanding and skills by providing effective participation in all innovative practices in the field of education (Tutkun and Aksoyalp, 2010, p.363).

The seven golden skills of the 21st century were listed by Wagner (2008) as follows (quoted by Kıyasoğlu and Çeviker Ay, 2020, p.241):

1. Critical thinking and problem solving,
2. Cooperation between systems and individuals and leadership,
3. Astute intelligence and adaptation,
4. Entrepreneurship and taking initiatives,
5. Effective oral and written communication,
6. Access to and analysis of information,
7. Curiosity and imagination.

Critical thinking and problem solving skills refers to testing the accuracy of the information obtained, questioning what this information will work for and using the information correctly in solving the problem. Cooperation between systems and individuals and leadership skills include capabilities to adapt to the system of which people are part, to learn from each other by cooperating, and to obtain information about different cultures and to accommodate these cultures. The astute intelligence and adaptation skills encompasses the ability to produce quick, new and creative solutions to the problems encountered in learning environments or real life, to adapt to cultural change and to renew oneself in line with these changes (Wagner, 2008, quoted by Orhan Göksün and Kurt, 2017, p.4). The entrepreneurship and initiative skills mean that individuals are required to use self-management and self-control strategies to obtain information and overcome the difficulties in their business life, and to take initiatives that direct learning and business life about their interests. Effective verbal and written communication skills include active use of speaking and writing through printed or digital media. The ability to access and analyze information entails the skills that students need to overcome the information overload seen in the 21st century (Orhan Göksün and Kurt, 2017, p.4). Curiosity means being willing to reach information, to detect the problems and to solve them while imagination means having a broader mind and perspective in situations of interpreting and synthesising information, and finding solutions to problems.

Orhan Göksün (2016) examined the 21st century teacher skills by categorizing them under the titles of “General Teacher Competencies of MEB”, “ISTE Standards for Teachers”, “49 Techniques of Effective Teaching” and “How to Be Good Teacher ”. In our country, the Ministry of National Education has divided the *teacher competencies* into six groups: Personal and professional development, student recognition, process of learning and teaching, monitoring and evaluation of learning and development, the relationships between school, family and society, curriculum and content knowledge (MEB, 2017). International Teachers' Competencies are determined by the International Educational Technologies Society (ISTE) under seven standards. These standards for teachers are as follows:

1. Student: Learning with others, benefiting from technology and innovative practices to enable students to learn.

2. Leader: Giving students tasks to accomplish, support the students’ success, searching for leadership opportunities to develop teaching and learning.

3. Digital Citizenship: Inspiring students to contribute positively to the digital world and to participate in a responsible manner.

4. Collaborator: Cooperating with colleagues and students to solve problems, discovering and sharing new ideas.

5. Designer: Recognizing the changes in students, adapting to these changes, designing student -oriented activities and environments.

6. Facilitator: Helping students to learn by using technology.

7. Analyst: Understanding and using the data in order to direct their teaching and to support students in achieving their learning goals (ISTE, 2018).

49 techniques of effective teaching involve creating high academic expectations, making plans for academic success, structuring and presenting lessons, providing students to participate in the course, building a strong classroom culture, creating and maintaining high behavioral expectations, and strengthening the character and honesty. On the other hand, *how to become good teachers* involve arranging environments for change, arranging personal spaces and materials, reflective teaching model, forming a model as a leader, practising between classes, cooperating with parents, creating a permanent learning environment, creating a culture of citizenship (Lemov, 2010; Melvin, 2011; Orhan Göksün, 2016).

The 21st century has witnessed numerous changes in the quality and quantity of knowledge and skills as well as in accessing and transferring information. These changes have naturally affected the process of learning and teaching directly. For this reason, it is important for an effective education process to evaluate the readiness of teachers who are responsible for teaching activities in schools for these changes and whether they have required skills and competencies in accordance with these changes.

The aim of this study is to evaluate the levels of 21st century teaching skills of classroom teachers working in primary schools. In line with that, the following questions were sought in the quantitative dimension of the study:

1. What is the level of 21st century teaching skills of the participant classroom teachers?
2. Do the 21st century teaching skill levels of the classroom teachers differ significantly in terms of gender?
3. Do the 21st century skill levels of the classroom teachers differ significantly in terms of age?
4. Do the 21st century skill levels of the classroom teachers differ significantly in terms of seniority in the profession?
5. Do the 21st century skill levels of the classroom teachers differ significantly in terms of educational levels?

The following questions were sought in the qualitative dimension of the study:

What are the views of the teachers on

1. keeping records of students' learning processes?
2. the status of determining the class rules together with the students?
3. the use of technology in teaching activities?
4. the reinforcement of the students' positive behavior?
5. the situation of students to respect individual differences?
6. the status of educational or social activity organizing outside the classroom?
7. the status of preparing authentic materials for their lessons?

METHOD

Research Model

An explanatory sequential pattern of mixed research methods was used in the study. The mixed method is an approach employed to use both qualitative and quantitative data to understand the research problems and thus benefitting from the advantages of both data sets (Creswell, 2019, p.2). The explanatory sequential pattern is based on collecting and analysing quantitative data before collecting and analysing the qualitative data and used primarily to explain or expand quantitative results (Creswell, 2019, p. 38).

The Population and Sample

The population of this study consists of 833 classroom teachers working in a city center in the Central Anatolia Region of Turkey in 2020-2021 academic year. The study sample consists of 268 class teachers determined by convenience sampling method in the quantitative dimension of the study. Convenience sampling is the method in which each sampling unit is equally selected (Büyüköztürk et al., 2020, p.88). The following formula was used to determine the sample size. The sample size was calculated as 264 people with 95 % confidence interval and applied to 268 teachers.

$$N = \frac{Nt^2pq}{d^2(N - 1) + t^2pq}$$

The demographic data of the participant teachers in the sample of the quantitative dimension of the study is presented in Table 1.

Table 1. The demographic data of the participant teachers in the quantitative dimension of the study

		<i>f</i>	%
Gender	Male	128	47,8
	Female	140	52,2
Age	20 - 25 years	9	3,4
	26 - 30 years	15	5,6
	31 - 35 years	33	12,3
	36- 40 years	52	19,4
	41- 45 years	51	19,0
	46- 50 years	51	19,0
	51- 55 years	40	14,9
	56 and over	17	6,3
Seniority in the profession	0 - 5 years	24	9,0
	6 - 10 years	29	10,8
	11- 15 years	56	20,9
	16 -20 years	34	12,7
	21 - 25 years	55	20,5
	26 - 30 years	44	16,4
Educational level	31 years and over	26	9,7
	Vocational school	19	7,1
	Undergraduate	208	77,6
	Graduate	41	15,3

In the qualitative dimension of the study, a semi-structured interview was conducted with 20 teachers. Convenience sampling method was used for determining the teachers to be interviewed. The demographic data of the participant teachers who were interviewed is presented in Table 2.

Table 2. The demographic data of the teachers who were interviewed

		<i>f</i>	%
Gender	Male	128	47,8
	Female	140	52,2
Age	20 - 25 years	9	3,4
	26 - 30 years	15	5,6
	31 - 35 years	33	12,3
	36- 40 years	52	19,4
	41- 45 years	51	19,0
	46- 50 years	51	19,0
	51-55 years	40	14,9
	56 and over	17	6,3
Seniority in the profession	0 - 5 years	24	9,0
	6 - 10 years	29	10,8
	11 - 15 years	56	20,9
	16 - 20 years	34	12,7
	21- 25 years	55	20,5
	26- 30 years	44	16,4
Educational level	31 years and over	26	9,7
	Vocational school	19	7,1
	Undergraduate	208	77,6
	Graduate	41	15,3

Data Collection Tools

21st Century Teaching Skills Scale was used to collect quantitative data and a *semi-structured interview form* was used in order to collect qualitative data. The 21st Century Teaching Skills Scale is a 5 point-Likert type tool with 27 items and was developed by Orhan Göksün (2016). The scale consists of five sub-dimensions: administrative, technopedagogical, confirmatory, flexible teaching and productive skills. The high scores in the total scale and sub-dimensions indicate the high frequency of the use of the 21st century teaching skills.

While developing a scale by the researchers, a draft pool of 61 items was created and focus group interviews were made with sixteen teachers from different branches. Then a content analysis was performed with the data obtained from the interviews. Within the scope of validity studies, expert opinion was obtained from seven different disciplines. In line with the expert opinions, the number of items was reduced to 59. As a result of the explanatory factor analysis, the factor load limit was taken as .40. After the confirmatory factor analysis of the scale, the reliability studies were completed by test-retest method on a group.

The highest score to be obtained from the scale is 135 points and the lowest score is 27 points. In addition, the scale intervals were determined in order to evaluate the mean scores of the teachers from the 21st century teaching skills scale. In order to perform this, the difference (5-1= 4) between the lowest (1) and the highest (5) scores of the scale was divided into the number of intervals (5) and each interval was calculated as 0.8 points. Accordingly, in order to evaluate the skill levels of the teachers on the general and sub-dimensions of the scale, the mean scores between 1.00-1.80 were evaluated as *never*, between 1.81-2.60 as *rarely*, between 2.61-3.40 as *occasionally*, between 3.41-4.20 as *usually* and between 4.21-5.00 as *always*.

Cronbach's Alpha reliability coefficient of this scale, whose validity and reliability was previously carried out, was calculated as 0.91 for the total scale, 0.85 for administrative skills subscale, 0.66 for technopedagogical skills subscale, 0.52 for confirmatory skills subscale and 0.86 for flexible teaching skills subscale and 0.74 for the productive skills subscale. It was accepted that the scale was sufficiently reliable since the reliability coefficient of the total scale was high.

The semi-structured interview form in which qualitative data were obtained was prepared in parallel with the sub-dimensions of the 21st Century Teaching Skills Scale. In line with this purpose, a

total of 10 questions, including two questions about all dimensions of the scale, were prepared. Expert opinion for the interview form prepared was received from three different academics. In the light of expert opinions, two questions were completely changed and three questions were changed in terms of format. Two questions were excluded and two questions were combined and finally a seven-item interview form was created including two questions about administrative skills (questions 1 and 2), technopedagogical skills (question 3), two questions about confirmatory skills (questions 4 and 5), flexible teaching (question 6) and production skills (question 7).

Data Collection and Data Analysis

Data collection tools, which consist of the 21st Century Teaching Skills Scale and the semi-structured interview forms, were administered to the participants by the researcher by obtaining permission from the Provincial Directorate of National Education. The 21st Century Teaching Skills Scale was responded by 268 teachers. SPSS 22 program was used for to analyse the quantitative data obtained from the scale.

In order to determine the tests to be performed in the analysis of quantitative data, the normality of the distribution of the data was examined. The results of the Kolmogorov-Smirnov and Shapiro Wilk test (when the number of elements in the group is below 50), Q-Q plot and histogram graphics were checked. It was found that the data did not normally distributed. So, it was decided that valid and reliable results could be achieved by using nonparametric tests for analysis of data. Descriptive statistics were used in order to determine the 21st century teaching skill levels of teachers. Mann-Whitney U-Test and Kruskal Wallis H-test were used in order to determine whether 21st century teaching skills differed according to the independent variables.

The semi-structured interview form created by the researchers in order to collect qualitative data was applied to 20 teachers determined by convenience sampling method and the statements of the teachers were recorded in writing. The data obtained from the interviews were analyzed using NVivo 11 package program. Content analysis was performed by using codes and categories in order to summarize the responses of the participants to the questions make it clearer and more understandable (Sağlam and Kanadlı, 2021). The aim of the content analysis is to reveal the concepts and relationships that can explain the data (Yıldırım and Şimşek, 2008, p.227). The content analysis was conducted by both researchers in order to ensure the coder reliability. In order to ensure the reliability of the qualitative dimension of the study, the data were coded separately by the two researchers, and then the coding was compared and common categories and themes were created. It was revealed that there was a high compliance at the level of the .85 between the codes created by the researchers. In addition, the data obtained from the participants were transferred directly by quotations without interpreting them. Expert examination was conducted for the validity studies and the purposeful sampling method was used.

FINDINGS

The findings of the quantitative and qualitative subproblems of the study are presented below.

1. Quantitative findings

In this section, the level of classroom teachers' 21st century teaching skills in terms of various variables were explained.

1.1. The level of classroom teachers' 21st century teaching skills

The data on the level of 21st century teaching skills of the classroom teachers are presented in Table 3.

Table 3. Descriptive Statistics of Classroom Teachers' 21st Century Teaching Skills

Scale/Subscales	N	Min	Max	\bar{X}	Ss
21st century teaching skills	268	2,37	4,93	3,97	0,446
Administrative skills	268	2,42	5,00	4,06	0,496
Technopaedagogic skills	268	2,00	4,75	3,70	0,492
Confirmatory skills	268	3,00	5,00	4,71	0,357
Flexible teaching skills	268	1,00	5,00	3,47	0,925
Productive skills	268	1,50	5,00	3,96	0,753

When Table 3 is examined, it is seen that the classroom teachers “*usually*” use the 21st century teaching skills ($\bar{x} = 3,97$). The most frequently used skills by the classroom teachers are confirmatory skills ($\bar{x} = 4,71$), administrative skills ($\bar{x} = 4,06$), productive skills ($\bar{x} = 3,96$), technopaedagogical skills ($\bar{x} = 3,70$) and the least used skill is flexible teaching skills ($\bar{x} = 3,47$). In addition, it is obvious that the classroom teachers “*always*” use the confirmatory skills and “*usually*” the administrative, technopaedagogical, flexible teaching and productive skills.

The results of Mann-Whitney U-test performed to determine whether the 21st century teaching skills of the classroom teachers differ significantly in terms of gender, are presented in Table 4.

Table 4. The Results of Mann-Whitney U-test of the 21st Century Teaching Skills of the Classroom Teachers in terms of Gender

Scale	Gender	N	Mean	Total	U	Z	p
21st century teaching skills	Male	128	135,49	17343,00	8833,00	-,200	,841
	Female	140	133,59	18703,00			
Administrative skills	Male	128	129,75	16608,50	8352,50	-,960	,337
	Female	140	138,84	19437,50			
Technopaedagogic skills	Male	128	140,11	17933,50	8242,50	-1,136	,256
	Female	140	129,38	18112,50			
Confirmatory skills	Male	128	131,45	16825,00	8569,00	-,665	,506
	Female	140	137,29	19221,00			
Flexible teaching skills	Male	128	148,64	19026,50	7149,50	-2,911	,004
	Female	140	121,57	17019,50			
Productive skills	Male	128	136,55	17478,50	8697,50	-,424	,672
	Female						

When Table 4 is examined, it is seen that the 21st century teaching skills of classroom teachers and their subdimensions including administrative skills, technopaedagogical skills, confirmatory skills and productive skills do not differ significantly differences in terms of gender. However, flexible teaching skills differs significantly in favor of male teachers ($p < 0,05$). Therefore, it can be argued that the ability to organize educational and social activity out of classroom is higher in male teachers.

The results of Kruskal-Wallis H-test performed to determine whether the 21st century teaching skills levels of classroom teachers differ significantly in terms of age are presented in Table 5.

Table 5. The results of Kruskal-Wallis H-test of the 21st Century Teaching Skills Levels of Classroom Teachers in terms of Age

Scale	Age	N	Mean Rank	sd	χ^2	p
21st century teaching skills	20-25 years	9	123,33	7	8,962	,255
	26-30 years	15	96,43			
	31-35 years	33	126,42			
	36-40 years	52	127,57			
	41-45 years	51	131,85			
	46-50 years	51	139,36			
	51-55 years	40	155,99			
	56 and over	17	153,68			
Administrative skills	20-25 years	9	133,11	7	5,687	,577
	26-30 years	15	118,93			
	31-35 years	33	119,26			
	36-40 years	52	130,31			
	41-45 years	51	127,56			
	46-50 years	51	140,98			
	51-55 years	40	152,30			
	56 and over	17	150,88			
Technopaedagogic skills	20-25 years	9	85,61	7	17,996	,012
	26-30 years	15	75,00			
	31-35 years	33	137,30			
	36-40 years	52	126,16			
	41-45 years	51	139,81			
	46-50 years	51	137,86			
	51-55 years	40	157,48			
	56 and over	17	152,85			
Confirmatory skills	20-25 years	9	122,78	7	21,609	,003
	26-30 years	15	103,17			
	31-35 years	33	122,00			
	36-40 years	52	118,04			
	41-45 years	51	139,86			
	46-50 years	51	157,65			
	51-55 years	40	159,65			
	56 and over	17	98,26			
Flexible teaching skills	20-25 years	9	140,83	7	9,700	,206
	26-30 years	15	108,90			
	31-35 years	33	125,71			
	36-40 years	52	137,72			
	41-45 years	51	123,52			
	46-50 years	51	131,74			
	51-55 years	40	144,81			
	56 and over	17	177,91			
Productive skills	20-25 years	9	149,50	7	2,101	,954
	26-30 years	15	119,43			
	31-35 years	33	131,73			
	36-40 years	52	138,44			
	41-45 years	51	129,55			
	46-50 years	51	131,89			
	51-55 years	40	137,35			
	56 and over	17	149,15			

When Table 5 is examined, it is seen that the 21st century teaching skills of classroom teachers and their subdimensions including administrative skills, flexible teaching skills, and productive skills do not differ significantly in terms of age. However, there is a significant difference in technopedagogical skills and confirmatory skills sub-dimensions ($p < 0.05$). In order to determine the source of this difference, binary comparisons in Mann-Whitney U-test were made and it was found that there were significant differences between teachers aged 26-30 years and 41-45 years, in favour of teachers of 41-45 years; between teachers aged 26-30 years and 46-50 years, in favor of teachers of 46-50 years; between teachers aged 26-30 years and 51-55 years, in favor of teachers of 51-55 years of age, in technopaedagogical sub-dimension.

Moreover, it was found that there were significant differences between teachers aged 36-40 years and 46-50 years, in favor of teachers of 46-50 years; between teachers aged 36-40 years and 51-55 years, in favor of 51-55 years; between teachers aged 46-50 and those over 55 years, in favor of teachers of 46-50 years and finally between teachers aged 51-55 years and those over 55 years, in favor of 51-55 years, in the subdimension of the confirmatory skills.

The results of Kruskal-Wallis H-test performed to determine whether the 21st century teaching skills levels of classroom teachers differ significantly in terms of seniority in the profession are presented in Table 6.

Table 6. The Results of Kruskal-Wallis H-test of the 21st Century Teaching Skills Levels of Classroom Teachers in terms of Seniority in the Profession

Scale	Seniority	N	Mean Rank	sd	χ^2	p
21st century teaching skills	0 - 5 years	24	110,44	5	8,815	,117
	6-10 years	29	113,60			
	11-15 years	56	129,83			
	16-20 years	34	126,96			
	21-25 years	55	148,70			
	26 year and over	70	147,65			
	Total	268				
Administrative skills	0 - 5 years	24	121,50	5	4,581	,469
	6-10 years	29	125,59			
	11-15 years	56	125,85			
	16-20 years	34	126,09			
	21-25 years	55	146,23			
	26 year and over	70	144,44			
	Total	268				
Technopaedagogic skills	0 - 5 years	24	92,71	5	14,545	,012
	6-10 years	29	110,33			
	11-15 years	56	130,81			
	16-20 years	34	136,94			
	21-25 years	55	147,64			
	26 year and over	70	150,29			
	Total	268				
Confirmatory skills	0 - 5 years	24	108,17	5	15,683	,008
	6-10 years	29	114,48			
	11-15 years	56	126,85			
	16-20 years	34	119,28			
	21-25 years	55	158,40			
	26 year and over	70	146,56			
	Total	268				
Flexible teaching skills	0 - 5 years	24	113,21	5	10,030	,074
	6-10 years	29	110,93			
	11-15 years	56	140,31			
	16-20 years	34	123,72			
	21-25 years	55	132,89			
	26 year and over	70	153,41			
	Total	268				
Productive skills	0 - 5 years	24	137,88	5	7,364	,195
	6-10 years	29	107,55			
	11-15 years	56	145,33			
	16-20 years	34	121,50			
	21-25 years	55	146,82			
	26 years and over	70	132,48			
	Total	268				

When Table 6 is examined, it is seen that there is no significant difference in the 21st century teaching skills of classroom teachers and their subdimensions including administrative skills, flexible teaching skills and productive skills in terms of seniority in the profession. However, there is a significant difference in technopaedagogical skills and confirmatory skills in terms of seniority in the

profession ($p < .05$). In order to determine the source of this difference, binary comparisons in Mann-Whitney U-test were made and it was found that there were significant differences between teachers with a seniority of 0-5 years and teachers with 21-25 years of seniority, in favour of those between 21-25 years of seniority; between teachers with a seniority of 0-5 years and teachers with 26 years and over, in favor of teachers with a seniority of 26 years and over in technopaedagogical sub-dimension.

Moreover, it was found that there were significant differences between teachers with a seniority of 0-5 years and teachers with 21-25 years of seniority, in favour of those between 21-25 years of seniority; between teachers with a seniority of 6-10 years and teachers with 21-25 years of seniority, in favor of teachers with a seniority of 21-25 years in the subdimension of the confirmatory skills.

The results of Kruskal-Wallis H-test performed to determine whether the 21st century teaching skills levels of classroom teachers differ significantly in terms of educational levels in the profession are presented in Table 7.

Table 7. The Results of Kruskal-Wallis H-test of the 21st Century Teaching Skills Levels of Classroom Teachers in terms of Educational Levels

Scale	Educational level	N	Mean Rank	sd	χ^2	p
21st century teaching skills	Vocational school	19	119,18	2	1,372	,504
	Undergraduate	208	134,02			
	Graduate	41	144,04			
	Total	268				
Administrative skills	Vocational school	19	128,24	2	,686	,710
	Undergraduate	208	133,36			
	Graduate	41	143,18			
	Total	268				
Technopaedagogic skills	Vocational school	19	107,18	2	5,264	,072
	Undergraduate	208	133,01			
	Graduate	41	154,72			
	Total	268				
Confirmatory skills	Vocational school	19	119,37	2	1,082	,582
	Undergraduate	208	136,50			
	Graduate	41	131,35			
	Total	268				
Flexible teaching skills	Associate degree	19	112,58	2	3,264	,195
	Undergraduate	208	133,50			
	Graduate	41	149,76			
	Total	268				
Productive skills	Associate degree	19	130,82	2	,720	,698
	Undergraduate	208	136,53			
	Graduate	41	125,91			
	Total	268				

When Table 6 is examined, it is seen that there is no significant difference in the 21st century teaching skills of classroom teachers and their subdimensions in terms of educational levels.

2. Findings on the Qualitative Dimension of the Study

The classroom teachers' views about the 21st century teaching skills levels are included in this section.

2.1 Classroom Teachers' Keeping Records of Students' Learning Processes

In order to examine the situation of classroom teachers about keeping records of learning processes of the students, the question "Would you keep a record of your students' learning processes?" was asked to the study group, responded by 18 positive and 2 negative answers. Those

who responded positively were asked "What kind of records do you keep about your students' learning processes?". The findings obtained from the relevant question are given in Figure 1.

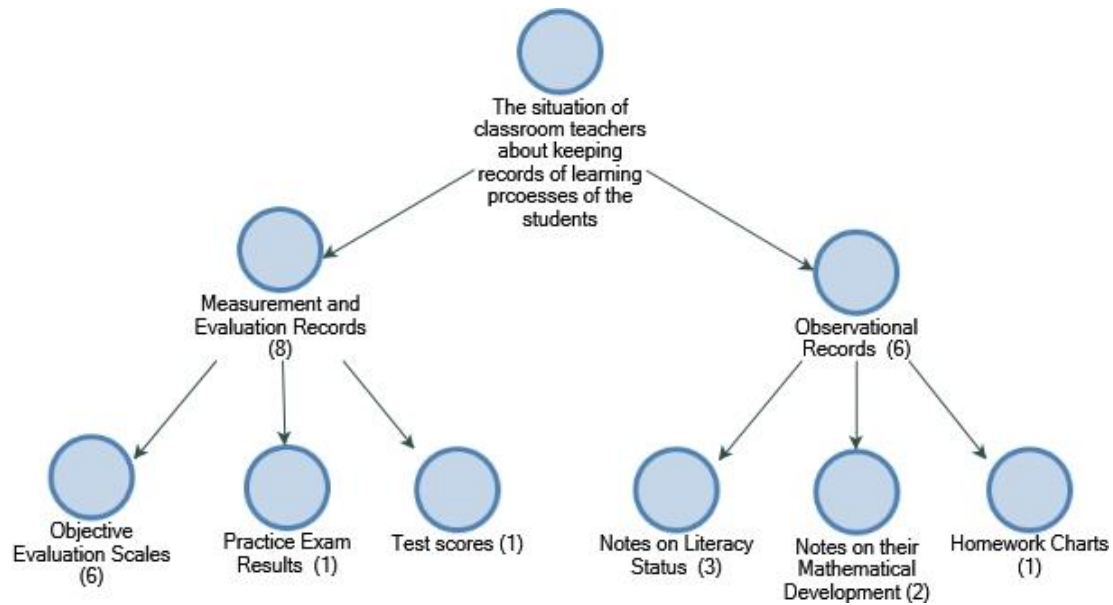


Figure 1. The Situation of Classroom Teachers About Keeping Records of Learning Processes of the Students

When Figure 1 is examined, it is seen that classroom teachers more frequently keep measurement and evaluation records (f: 8) and observation records (f: 6). The measurement and evaluation records are objective evaluation scales (f: 6), practice exam results (f: 1) and test scores (f: 1). On the other hand, the observational records are kept as notes on the mathematical development of the students (f: 2), literacy (f: 1) and homework charts (f: 1).

Some direct quotations from the statements showing the record keeping situations of classroom teachers in the learning processes of the students are as follows:

“I definitely keep records to check whether students have learned the objectives or not.” (Teacher2-Male)

“I keep observation, experiment and evaluation records of learning processes. I try to revise my teaching every day after I finish any topic.” (Teacher18-Female)

“I take notes for the whole class about their literacy, writing skills, and their mathematical development.” (Teacher1-Female)

2.2 The Situation of Classroom Teachers about Setting Classroom Rules together with the Students

In order to examine the classroom teachers' setting classroom rules together with their students, the question "Do you set the classroom rules together with your students?" was asked to the study group. This question was responded by 19 “yes” and 1 “no” answers. Those who answered positively were asked “What kind of rules do you set with your students?”. The findings obtained from the relevant question are shown in Figure 2.

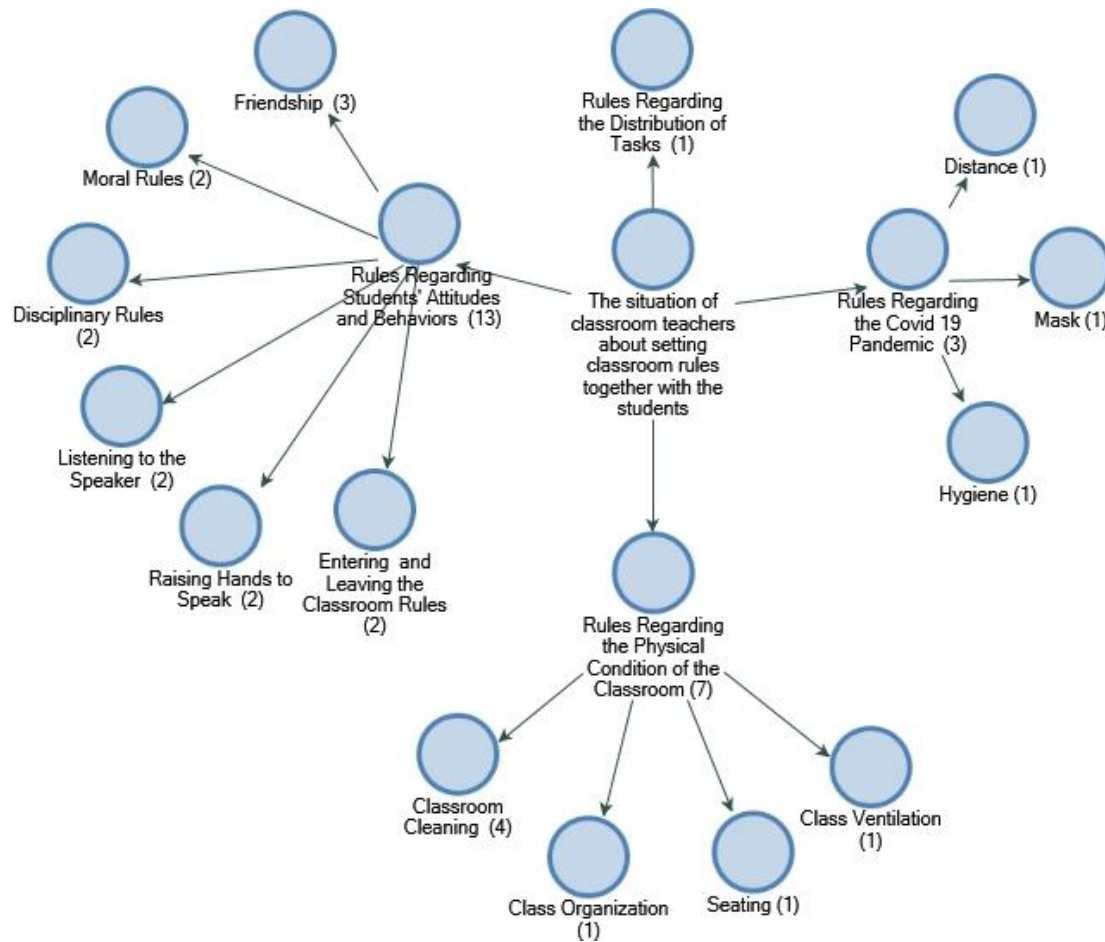


Figure 2. The Situation of Classroom Teachers about Setting Classroom Rules together with the Students

When Figure 2 is examined, it is seen that the rules determined by the classroom teachers together with the students include attitudes and behaviors of the students (f: 13), physical condition of the classroom (f: 7), Covid 19 pandemic (f: 3) and the rules regarding the distribution of tasks (f: 1). The rules related to the students' attitudes and behaviors associate with friendship relations (f:3), moral rules (f:2), discipline rules (f:2), listening to the speaker (f:2), entering and leaving the classroom (f:2), the rules of speaking by raising a hand (f:2). The rules regarding the physical condition of the classroom are related to classroom hygiene (f:4), ventilation (f:1), class layout (f:1) and rows and seating (f:1). It is also seen that the rules regarding the Covid 19 pandemic are related to hygiene (f: 1), wearing masks (f: 1) and keeping social distance (f: 1).

Some direct quotations from the statements showing rule setting situations of classroom teachers together with the students are as follows:

“We set the rules on subjects such as class order and organization, hygiene, entering and leaving the class, speaking rules, and food menu.” (Teacher2-Male)

“Asking for permission, class representative, games, seating etc.” (Teacher5-Male)

“First of all, I make sure that the rules are acceptable, simple, clear, understandable, as few as possible, supported with pictures and figures, and created with the participation of students. (To enter the class on time, not to interrupt the speakers, to ventilate the class during breaks, not to take off the masks, to keep a distance, not to fight, not to run in the classroom and in the corridors, not to throw garbage on the floor, not to fight, to be kind to everyone, etc.)” (Teacher18-Female)

2.3 Technology Using Situations of Classroom Teachers in Teaching Activities

In order to examine technology using situations of classroom teachers in enriching their teaching activities, the question "Can you enrich your teaching activities with technology?" was asked to the study group, responded by 18 positive answers and one negative. Those who answered positively, were asked "What kind of technologies do you enrich your teaching activities?". The findings obtained from the relevant question are shown in Figure 3.

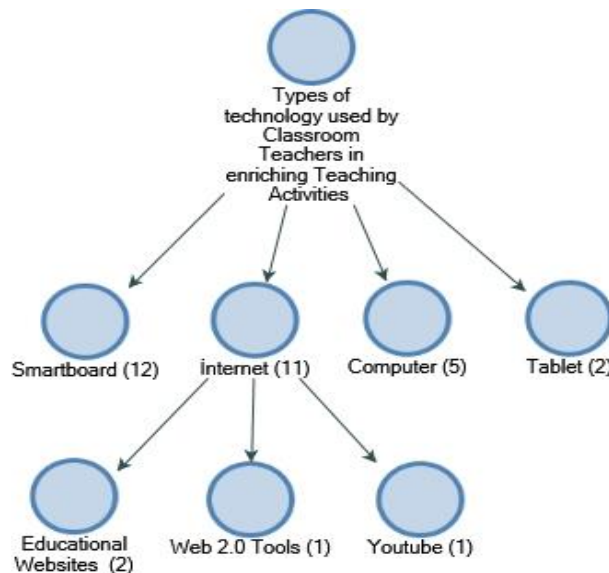


Figure 3. Types of Technology Used by Classroom Teachers in Enriching Teaching Activities

When Figure 3 is examined, it is seen that the type of technology mostly used by classroom teachers enrich their teaching activities include the smartboard (f:12), internet (f:11), computer (f:5), and tablet computers (f:2) respectively. The type of technology enriched by the Internet includes educational sites (f:2), Web 2.0. tools (f:1) and Youtube (f:1).

Some direct quotations from the statements showing classroom teachers' use of technology to enrich teaching activities are as follows:

"I download videos from the Internet, prepare slides at home and use the classroom computer effectively." (Teacher1-Female)

"I benefit from educational sites and other teachers' activities using the smart board." (Teacher3-Male)

"I actively use the smartboard and the web while teaching." (Teacher17-Male)

2.4 The Situations of Classroom Teachers' Reinforcing Students' Desired Behaviors

In order to examine the classroom teachers' reinforcing the desired behaviors of the students, the question "Can you reinforce the positive behaviors of your students?" was asked to the study group, responded by 19 positive answers and 1 negative answer. Those who answered positively were asked "How do you reinforce the positive behaviors of your students?". The findings obtained from the relevant question are shown in Figure 4.

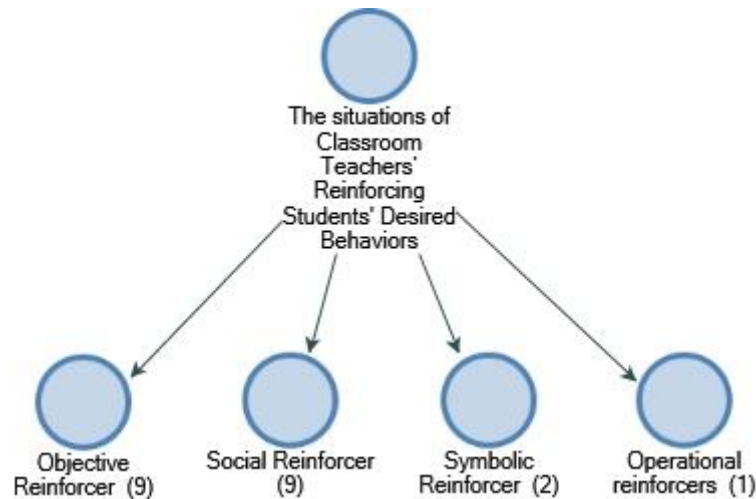


Figure 4. The situations of Classroom Teachers' Reinforcing Students' Desired Behaviors

When the responses of the teachers who stated that they reinforce the desired behaviors of the students in Figure 4 are examined, it is seen that the classroom teachers mostly use social reinforcements such as applauding, appreciating, and showing model (f:9) and objective reinforcements such as rewards and gifts (f:9). However, it is seen that they use symbolic reinforcers (f:2) such as giving symbolic stars, despite being used less than other types of reinforcements, and operational reinforcers (f:1) such as permitting them to do an activity they like.

Some direct quotations from the statements showing classroom teachers' use of reinforcements for desired behaviours of the students are as follows:

“ I reward the student, give him/ her presents, make the students applaud him/ her and show as a model.” (Teacher 3-Male)

“I appreciate, motivate and thank to the student.” (Teacher 6-Male)

“ I permit the student to do their favourite activity.” (Teacher 19-Female)

2.5. Situations of Classroom Teachers to Ensure Students Respect Individual Differences

In order to examine how classroom teacher make the students' respect for individual differences, the question "Can you make your students respect individual differences?" was asked to the study group, responded by 19 positive answers and 1 negative answer. Those who answered positively were asked "How do you make your students respect individual differences?". The findings obtained from the relevant question are shown in Figure 5.

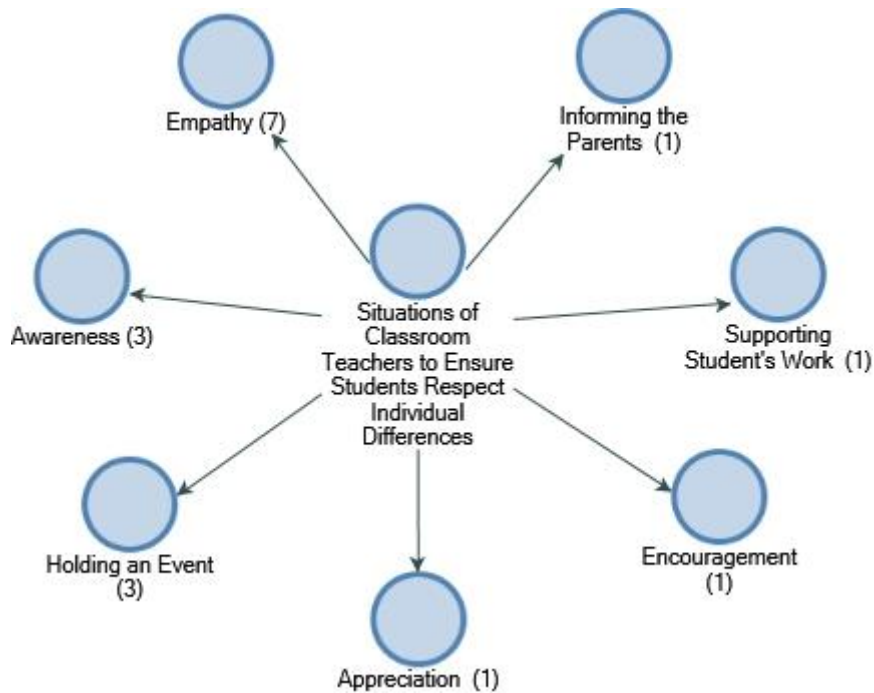


Figure 5. Situations of Classroom Teachers to Ensure Students Respect Individual Differences

When Figure 5 is examined, it is seen that classroom teachers mostly allow students to show empathy (f:7) in order to ensure that they respect individual differences, and then they raise students' awareness about individual differences (f:3) and perform various activities (f:3) on this subject. In addition, they encourage the students to respect individual differences (f: 1), appreciate those students who respect individual differences (f: 1), support their efforts to respect individual differences (f: 1), and raise awareness among the parents on this issue (f: 1).

Some direct quotations from the statements showing situations of classroom teachers to ensure students respect individual differences are as follows:

“I engage the students with various activities and make them empathize.” (Teacher5-Male)

“I build awareness that differences are a necessity of creation and that they are our greatest wealth.” (Teacher6-Male)

“I emphasize on the examples related to the subject. I prepare drama activities related to the subject.” (Teacher17-Male)

2. 6 Situations of Classroom Teachers' Organizing Educational or Social Activities Outside the Classroom

In order to examine the situations of classroom teachers' organizing educational or social activities outside the classroom, the question "Do you organize educational activities outside the classroom?" was asked to the study group, responded by 17 positive answers and 3 negative answers. Those who answered positively were asked “What kind of educational activities do you organize outside of the classroom?”. The findings obtained from the relevant question are shown in Figure 6.

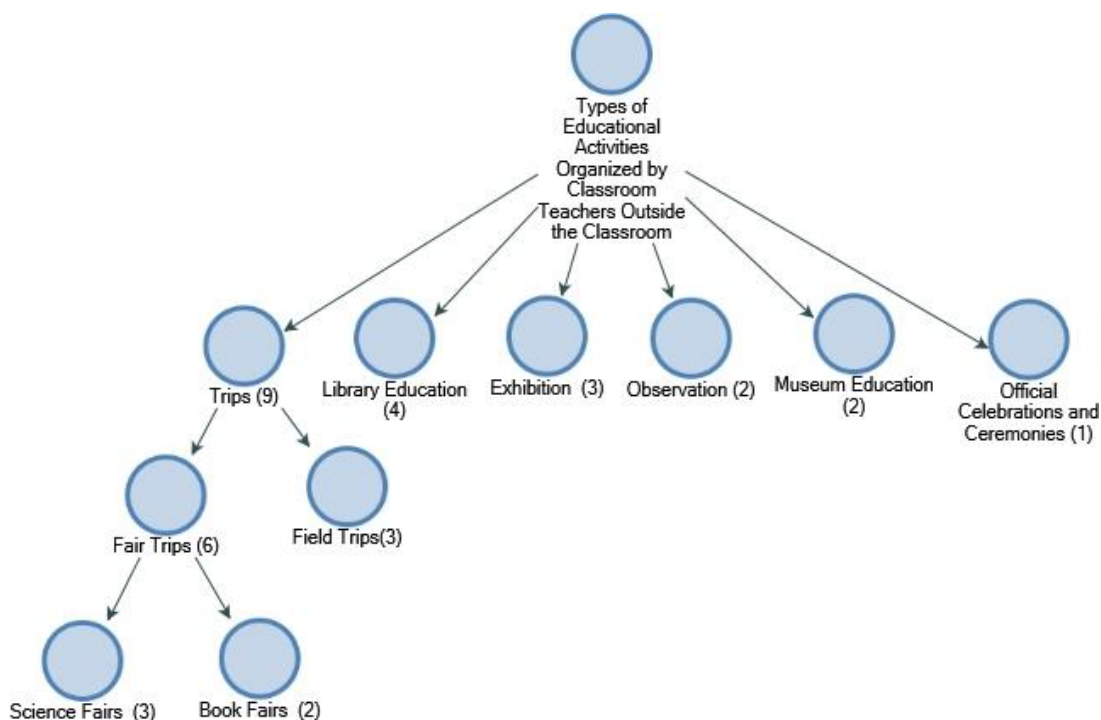


Figure 6. Types of Educational Activities Organized by Classroom Teachers Outside the Classroom

When Figure 6 is examined, it is seen that classroom teachers more often organize trips (f:9) as out-of-class educational activities, but library education (f:4), exhibition (f:3), observation (f:2), museum education (f:2) and official celebrations and ceremonies (f: 1). It is also seen that the trips are organized in the form of field trips (f: 3) and fair trips (f: 6) and the fair trips are organized in the form of science fairs (f: 3) and book fairs (f: 2).

Some direct quotations from the statements showing the types of educational activities organized by classroom teachers outside the classroom are as follows:

“I take the students to scientific events such as TÜBİTAK fairs organized by the municipality, governorship or ministry of national education.” (Teacher9-Male)

“As part of the school's project, we spend two lessons a month reading books in the library.” (Teacher15-Male)

“I am planning a trip to Museum of Sivas Congress, Çifte Minaret, Buruciye and Gök Madrasa.” (Teacher13-Male)

In order to examine the situations of classroom teachers' organizing social activities outside the classroom, the question "Do you organize social activities outside the classroom?" was asked to the study group responded by 17 positive answers and 3 negative answers. Those who answered positively were asked “What kind of social activities do you organize outside of the classroom?”. The findings obtained from the relevant question are shown in Figure 7.

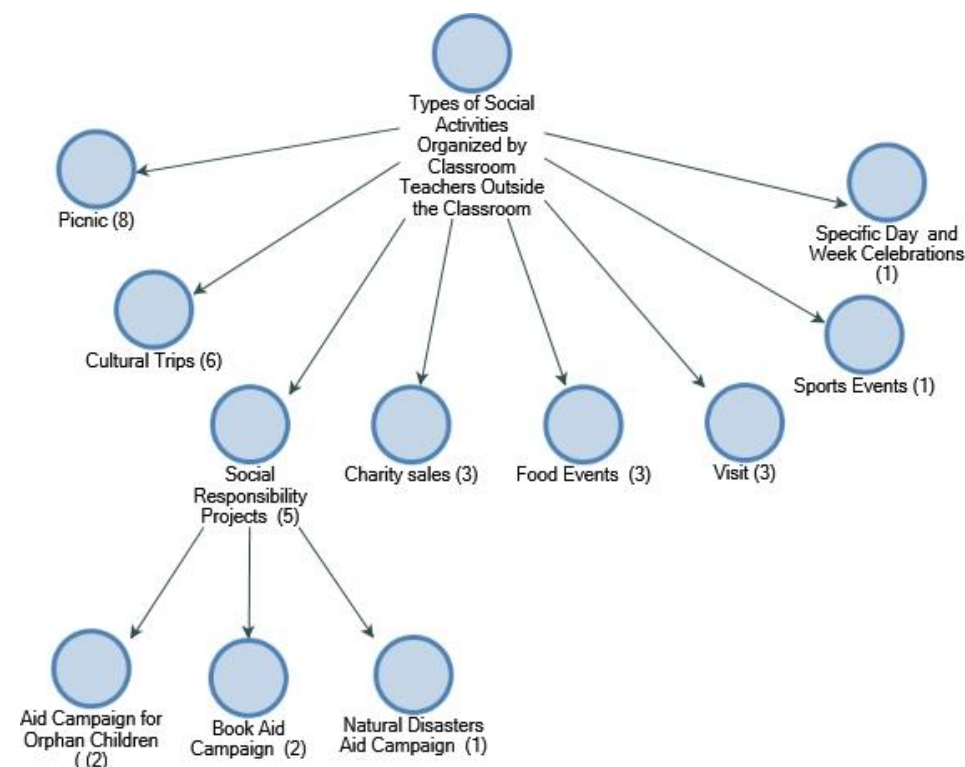


Figure 7. Types of Social Activities Organized by Classroom Teachers Outside the Classroom

When Figure 7 is examined, it is seen that classroom teachers mostly organize picnics (f:8) and cultural trips (f:6) as social activities outside the classroom, followed by social responsibility projects (f:5), as well as food events (f:3), visits (f: 3), charities (f:3), sports events (f:1) and celebrations of certain days and weeks (f:1). It is clear that social responsibility projects are in the form of natural disasters aid campaign (f: 1), book aid campaign (f: 2) and aid campaigns for orphan children.

Some direct quotations from the statements showing the situations of classroom teachers' organizing social activities outside the classroom are as follows:

“I organize a picnic with the participation of parents and students.” (Teacher2-Male)

“I take the children to the nursing home to visit the elderly.” (Teacher 13-Male)

“We are holding a fundraiser, a charity campaign for orphans and a book campaign for rural schools.” (Teacher 20-Female)

2.7. Authentic Material Preparation Situation of Classroom Teachers

In order to examine the classroom teachers' authentic material preparation situation, the question was asked to the study group "Can you prepare authentic materials for your lessons?" responded by 16 positive answers and 4 negative answers. Those who answered positively were asked “What kind of authentic materials do you prepare for your lessons?” The findings obtained from the relevant question are shown in Figure 8.

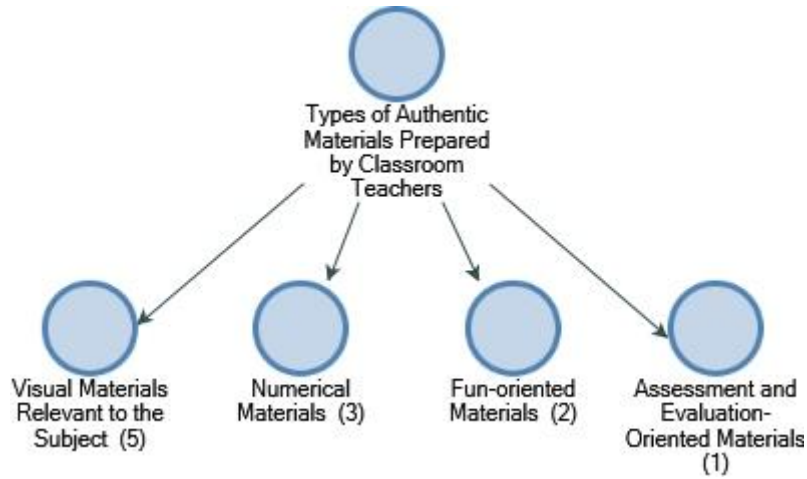


Figure 8. Types of Authentic Materials Prepared by Classroom Teachers

When Figure 8 is examined, it is seen that classroom teachers mostly prepare visual materials relevant to subject (f:5), numerical materials (f:3), fun-oriented materials (f:2) and assessment and evaluation-oriented materials (f:1), respectively.

Some direct quotations from the statements showing what kind of authentic materials the classroom teachers prepare are as follows:

“I prepare visuals suitable for the subject.” (Teacher 2-Male)

“I prepare simple materials on measuring time, reading numbers, four mathematical operations, etc. according to the students’ level.” (Teacher3-Male)

“I prepare game-related materials.” (Teacher9-Male)

DISCUSSION AND CONCLUSION

In this study conducted to reveal the perception levels of classroom teachers for 21st century teaching skills, the following results were obtained:

In line with the findings obtained in the quantitative dimension of the research, it was concluded that classroom teachers "generally" use their 21st century teaching skills, which is similar to other studies on 21st century teacher skills in the literature (Burakgazi et al., 2019; Cemaloğlu et al., 2019; Çelebi & Sevinç, 2019; Gürültü et al., 2018, Gürültü et al., 2020; Kıyasoğlu & Ay, 2020; Kozikoğlu & Özcanlı, 2020; Orhan Gökşun & Aşkı Kurt, 2017; Sulaiman & Ismail, 2020; Uyar & Çiçek, 2021; Viinikka et al., 2019; Yalçın İncik, 2020). In these studies, the 21st century teaching skill scores of the classroom teachers and teachers in other branches were found to be higher than the medium level. Based on this result, it can be argued that the classroom teachers are well-prepared and equipped for 21st century innovations and changing teaching strategies.

It was also found that the participant teachers “always” used confirmatory skills, and administrative, techno-pedagogical, flexible teaching and productive skills are “generally” used. In the light of these results, it can be interpreted that the classroom teachers pay attention to show positive behavior and be respectful in the classroom; are generally open and alert to technological developments, learning new information, new teaching methods and environments, have sufficient skills to adapt to the requirements of the period and use these skills in their professional lives.

When the sub-dimensions of 21st century teaching skills scale were examined separately, it was concluded that score of confirmatory skills were higher than other sub-dimensions. In the study by Miller and Pedro (2006), in which they investigated the parameters of teaching and encouraging

respect in classrooms for young children, and in studies investigating 21st century teaching and learning skills of teachers at different levels (Gürültü et al., 2018; Noise et al., 2020; Kıyasoğlu and Çeviker Ay, 2020; Kozikoğlu & Özcanlı, 2020; Orhan Göksün, 2016; Orhan Göksün & Aşkı Kurt, 2017; Uyar & Çiçek, 2021; Yalçın İncik, 2020), the high scores of confirmatory skills were similar to this result of the research. All these In the study by Asio and Riego de Dios (2018), the students got very high scores to confirmatory skills while evaluating their teachers. It can be considered significant that confirmatory skills are similarly high in different countries and cultures.

In this study, regarding the finding that the classroom teachers “*generally*” use technopedagogical skills, Garba, Byabazaire, and Busthami (2015) conducted a study with Malaysian teachers, although the teachers are competent in using computers, accessing and using online information and resources, and knowledge of integrating technology into teaching, it was concluded that the skills of integrating technology and pedagogy (technopedagogical skills) in teaching and presenting the subject content were not yet at a sufficient level. It has been suggested that the reason why teachers cannot integrate technology into education arises from the lack of sufficient computers and projectors in standard classrooms in Malaysia. In this study conducted with Turkish teachers, it can be said that providing internet, smart boards or projections to the classrooms in Turkey, especially within the scope of the FATİH project, is highly effective in integrating their technological skills into education and using technopedagogical skills “*generally*”.

It was observed that the lowest score obtained from the sub-dimensions of the 21st Century Teacher Skills Scale was in flexible teaching skills. In the studies conducted on this subject in the literature (Gürültü et al., 2018; Gürültü et al., 2020; Yalçın Incik, 2020; Kozikoğlu & Özcanlı, 2020; Uyar & Çiçek, 2021), the fact that the flexible teaching skills scores are lower than the other sub-dimensions overlaps this result of the study. Based on this result, it can be commented that the classroom teachers are not willing to organize educational and social activities, do not consider it necessary or these skills are not sufficiently developed. In the study of Asio and Riego de Dios (2018), in which they evaluated teachers' 21st century skills from the perspective of university students, the teachers' flexible teaching skills were found to be quite high, which contradicts this finding of the study. The main reason for this discrepancy may be due to the fact that the education in universities is more flexible than primary schools. However, since the studies were conducted in different countries, it can be thought that culture has an effect on this difference.

It was found that the mean scores of the classroom teachers in the total of 21st century teacher skills scale and in the sub-dimensions of administrative, technopedagogical, confirmatory and productive skills do not differ significantly in terms of gender. This overlaps with other studies in the literature that reveal the same results (Burakgazi et al., 2019; Cemaloğlu et al., 2019; Erten, 2020; Gürültü et al., 2020; Kozikoğlu & Özcanlı, Sulaiman & Ismail, 2020; Uyar & Çiçek, 2021; Yalçın İncik, 2020). However, it was revealed that flexible teaching skills, one of the sub-dimensions of the 21st century teacher skills scale, differed significantly difference in terms of gender and this difference was in favor of male teachers. In line with this result, it can be argued that male teachers organize more social and educational activities than female teachers. The study conducted by Gürültü et al (2018) has identified a significant difference in favor of male teachers in flexible teaching skills, which supports this.

While the 21st century teaching skills of classroom teachers and the sub-dimensions of these skills including administrative skills, flexible teaching skills and productive skills, do not differ in terms of age, there is a significant difference in the sub-dimensions of technopedagogical skills and confirmatory skills. In the technopedagogical sub-dimension, a significant difference was found between the teachers aged 26-30 years and those aged 41-45 years, in favor of 41-45 years; between the teachers aged 26-30 years and 46-50 years, in favor of 46-50 years; between the teachers aged 26-30 years and 51-55 years, in favor of 51-55 years. The study conducted by Sulaiman and Ismail (2020) also does not support this finding of the research, since 21st century teaching skills do not differ significantly in terms of age. This difference between the findings can be thought to be due to the

technological infrastructures, facilities and the differences in teachers' attitudes towards technology for various reasons, since the studies were conducted in different countries.

It was found that there were significant differences between teachers aged 36-40 years and 46-50 years, in favor of teachers aged 46-50 years; between teachers aged 36-40 years and 51-55 years, in favor of 51-55 years; between teachers aged 46-50 and those over 55 years, in favor of teachers aged 46-50 years and finally between teachers aged 51-55 years and those over 55 years, in favor of those 51-55 years, in the subdimension of the confirmatory skills.

While there is no significant difference in terms of seniority in the 21st century teaching skills of classroom teachers and the sub-dimensions of these skills including administrative skills, flexible teaching skills and productive skills, and in general scale, a significant difference was found in the sub-dimensions of technopedagogical skills and confirmatory skills. There were significant differences between teachers with a seniority of 0-5 years and teachers with 21-25 years of seniority, in favour of those between 21-25 years of seniority; between teachers with a seniority of 0-5 years and teachers with 26 years of seniority, in favor of teachers with a seniority of 26 years in technopaedagogical sub-dimension. Accordingly, in general sense, senior teachers have higher technopedagogical skills than less senior teachers. This result may be due to the fact that teachers who learned to use technology later considered using technological tools and equipment in the educational process as more interesting and intriguing than teachers born into technology. However, it can be thought that although more senior teachers consider themselves sufficient in terms of technopedagogical skills and think that they use these skills frequently, they do not use them sufficiently. For example, in the study conducted by Jansen and Merwe (2015) on the teachers from different branches working in different secondary schools, it was revealed that teachers generally do not have sufficient digital media literacy skills although they are self-confident technology users.

There was no significant difference between the 21st century teaching skills of classroom teachers and the sub-dimensions of these skills including administrative skills, technopedagogical skills, confirmatory skills, flexible teaching skills and productive skills.

According to the findings obtained from the qualitative dimension of the study, the following results were obtained:

When keeping records situations of the classroom teachers regarding the learning processes of the students are examined, it is seen that the classroom teachers keep records of the observation and evaluation forms showing the mathematical development, literacy and doing homework, and the achievement evaluation scales, the practice exam results and the measurement results with the test scores of the students. It is also clear that the records kept related to assessment and evaluation are generally related to objectives while the observation records consisted mostly of the notes kept about the literacy status of the students.

Based on the findings on determining the classroom rules together with the students, it was revealed that most of the teachers determined the classroom rules regarding the attitudes-behaviors of the students and the physical condition of the classroom, and some of them determined the rules together with the students due to the Covid 19 pandemic and the by distributing tasks in the classroom. The rules of students' attitudes and behaviors included friendship relations, entering and leaving the class, moral rules, disciplinary rules, listening to the speaker and speaking by raising a hand while the rules related to the physical condition of the class included seating arrangement, ventilation of the classroom, the organization of the class and hygiene. It has been found that the rules regarding the Covid 19 pandemic are in the form of mask, distance and hygiene rules. The findings of some studies on determining classroom rules support this finding of the study (Güleç, Bağçeli, & Onur, 2008; Sadık & Arslan, 2015; Kırbaş & Atay, 2017). In these studies, it has been found that classroom rules should be determined with the students in order to ensure effective classroom management and discipline, and that the majority of classroom teacher candidates prefer to determine the classroom rules together with the students.

When the opinions of the classroom teachers on the use of technology in teaching activities related to technopedagogical skills, one of the 21st century teacher skills, were examined, it was found that the majority of the classroom teachers used smart boards and internet to enrich their teaching activities, and some of them used technological tools such as computers and tablet computers. In addition, those teachers who use the Internet to enrich their teaching activities also benefit from educational sites, Web 2 tools and Youtube channels. Most of the teachers participating in the research of Jannah et al.(2020) reported that they used multimedia tools such as mobile phones, computers, internet, projectors, etc. In her research, Fatimah (2017) concluded that media technologies are really effective on the students' attitudes towards learning and support teachers' professional development, and the technology helps teachers to provide a better learning environment. It is obvious that the results of the related studies show similarities with the results obtained in this study regarding the technopedagogical skills of classroom teachers.

When the participant teachers' reinforcing students' desired behaviors in relation to confirmatory skills, one of the 21st century teacher skills, and the activities they do to ensure that students respect individual differences are examined, it is apparent that they use more objective and social reinforcers, as well as symbolic and operational reinforcements, while classroom teachers reinforce the positive behaviors of students. Social reinforcers used by classroom teachers generally include applauding, appreciating, showing as a model while objective reinforcers include rewards and gifts and symbolic reinforcers such as giving stars. On the other hand, operational reinforcers include making children do a favourite activity. Most of the classroom teachers make students show empathy and do activities to help them respect individual differences, build awareness of individual differences, and some teachers support and appreciate the students' work on individual differences, encourage them to do this kind of work, and inform the parents about individual differences. Miller and Pedro (2006) emphasized the place of respect in the educational environment in their study titled "Creating respectful classroom environments" and argued that success will occur in the environments where respect is internalized by both teachers and students. However, they argued that respect should be a critical component of all classroom settings.

Considering the situation of organizing educational or social activities outside the classroom regarding flexible teaching skills, one of the 21st century teacher skills, it is clear that most of the teachers organize trips as educational activities, but they also include library education, exhibitions, museum education, observation, official celebrations and ceremonies into the process alongside field and fair trips such as science fairs and book fairs. Social activities organized by most of the classroom teachers outside the classroom include picnics, cultural trips and social responsibility projects. It has been concluded that some of them are held in the form of charity sales, food events, visits, sports events and celebrations on certain days. In addition, it has been observed that social responsibility projects are held in the form of aid campaign for the victims of natural disasters, book donation campaigns and financial aid campaigns for orphan children.

When the situation of the classroom teachers' preparing authentic material for their lessons in relation to productive skills, one of the 21st century teacher skills, is examined, the majority of the classroom teachers reported that they prepared visual materials suitable for the subject. It was also found that some of them prepared digital, fun-oriented and measurement and evaluation-oriented materials.

When the literature review on the skills of teachers to create authentic materials is examined, it is seen that the classroom teachers mostly prepare the materials they use in both face-to-face and distance education on their own, their material design skills are high, and they are more creative in the materials they prepare manually than the computer-based materials. The finding that the teachers from other branches prepared the materials themselves instead of using ready-made materials such as worksheets, concept maps and presentations, supports this. (Arı, 2019; Çopur, 2022; Korkmaz, 2018; Kuloğlu, 2022; Yanpar et al.,2006).

Suggestions

In line with the results of the research, the following suggestions can be made:

Required central and local in-service trainings, courses and seminars should be organized by the Ministry of National Education in order to develop the 21st century teaching skills of all classroom teachers, especially on their technopedagogical, confirmatory and flexible teaching skills.

Planned needs analyses can be made on the level of use of 21st century teaching skills in educational institutions, and necessary arrangements can be made by informing the related private and public institutions about these identified needs.

The recommendations can be made for the future researchers who want to study 21st century teaching skills including using different scales, observation and interview forms; administering scales in different cities and larger samples; collaborating with the teachers working in different branches and at different school levels other than classroom teachers, examining pre-service teachers in different branches for the future researchers who want to study 21st century teaching skills. It can also be suggested that the demographic information of the participants should be expanded to investigate the effect on 21st century teacher skills, and to examine different factors that are thought to affect 21st century teacher skills.

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2nd author: Conceptualization, Writing- Original Draft Preparation and Final Draft Preparation/Submission, Qualitative Data Analysis, and Investigation

Ethical Statement: This material is the authors' own original work, which has not been previously published elsewhere. The paper is not currently being considered for publication elsewhere. The paper properly credits the meaningful contributions of co-authors. The results are appropriately placed in the context of prior and existing research. All sources used are properly disclosed (correct citation). All authors have been personally and actively involved in substantial work leading to the paper. The authors followed the all ethical standards established by their institutions and the participants participated in the research freely with full information about what it means for them to take part, and that they gave consent before they took part in the research.

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