



An Examination of Preservice Teachers' 21st Century Learner and Teacher Skills Based on Different Variables

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Abstract

This study examined the levels of preservice teachers' 21st century learner and teacher skills and the relationship between these two types of skills in terms of different variables. This study was a correlational survey. The data were collected using three instruments: the "21st Century Learner Skills Use Scale" and the "21st Century Teacher Skills Use Scale" developed by Orhan (2016) and a "Personal Information Form" prepared by the researcher. The population of the study consisted of preservice teachers studying at a state university located in the Eastern Anatolia Region of Turkey in the spring semester of the academic year of 2018–2019. The sample consisted of 445 preservice teachers determined by using the simple random sampling method from among the departments determined based on the cluster sampling method. Based on the results of the study, the use of the learner and teacher skills of the preservice teachers differed significantly depending on different variables such as gender, grade level and department, and there was a positive significant correlation between their uses of learner and teacher skills. It is hoped that the study will contribute to preservice teachers and the literature in terms of teacher competencies and education.

Keywords: 21st century learner skills, 21st century teacher skills, Preservice teachers, Teacher education, Teacher competencies, Turkish education.

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Contribution of this paper to the literature

This study contributes important to reveal the 21st century learner and teacher skill levels of pre-service teachers and what the relationship between these skills is.

1. Introduction

In an era of change at an unprecedented pace, advancements in science and technology have led to a rapid increase in knowledge, as well as making many pieces of existing knowledge become obsolete in a short period of time as three to five years. This necessitates versatile changes in many areas of social life. It is seen that, in today's world — where societies or people who can access information interpret the information they have, add new information to what they have and spread this information are considered powerful — the individual profile needed by societies has also changed and differentiated.

Globalization and advances in science and technology have been the main factors specifying the profile of human resources necessitated by today's societies. In other words, societies now seek people who improve themselves, adapt to the era and have critical, creative and reflective thinking skills. The fact that the focus is now on the process of teaching to learn in 21st century teacher competencies, and teaching is not limited to educational institutions has led people and societies to re-question their necessities (Soran *et al.*, 2006). Today's people are now expected to have the skills needed to adapt to rapid changes and developments, use the information they acquire in their lives, and thus, be able to participate in the society, make the right decisions, be productive and pursue their lives in the society (Belet Boyacı and Güner, 2019).

Teacher roles and competencies may also change pursuant to the conditions of the era so that the rapidly changing society may adapt to the realities of the world, enhance labor efficiency and plan education economically and politically. The changes brought about by the new century have necessitated the society's capacity to adapt to these changes and created the need to educate more competent teachers in accordance with the needs of the era (Kazu and Yenen, 2014). Teacher education and the profession of teaching— which have emerged in the Ottoman Reform Period dating from 1848 in the contemporary sense in Turkey and have been shaped by going through different processes to date (Akyüz, 2006) — have undergone many changes in the face of the needs such as taking advantage of the competitive environment that has emerged with the developing world and educating more competent people. Considering that education is the way to give people the qualities that have to be acquired within the scope of these needs, how globally important teacher education is may be understood better (Akdemir (2013).

The changing and evolving conditions of the world have undoubtedly caused transformations in learning environments just like in other areas. Learning-teaching processes have also been affected by this. While this transformation is addressed in a wide array of issues from the technological infrastructures of schools to teacher competencies, it may also be stated that learners and teachers are the most important actors of such a transformation (Dağhan *et al.*, 2017). All these changes and transformations have changed the needs of societies, learner characteristics and therefore the characteristics of teachers who educate learners in the 21st century.

In order for people to have a share of the employment of the 21st century, school diplomas that are acquired through basic knowledge and skills are insufficient. People need to have a set of skills that we may call 21st century skills which are beyond the basic skills that they have. While having sole knowledge has been valuable and valid in the past centuries, today, bare knowledge and acquiring knowledge alone are not sufficient. In order for the people of the 21st century to be successful in both educational life and business life, they have to be individuals who can think creatively and critically, collaborate with others, are problem solvers, have outstanding communication skills, know how to access the information they need, use technology to access information, are open to new ideas, are flexible and compliant, are self-directed and proactive, have advanced social and cultural skills, are productive and have leadership skills (Eryılmaz and Uluyol, 2015).

It has been highlighted in various studies in the literature that teachers should consider the needs of the 21st century while shaping their educational processes, and 21st century learners should have new knowledge and skills (Burns and Sinfield, 2004; Minton, 2005; Tennant *et al.*, 2009). While the significance of 21st century skills have been emphasized in several studies (Lai and Viering, 2012; Eryılmaz and Uluyol, 2015; Orhan Gökşün and Kurt, 2017), there are varying views in the literature on what 21st century skills are (Kylonen, 2012; Lai and Viering, 2012; Dicerbo, 2014). Therefore, it is considered that it is important to present what 21st century skills are and provide an acceptable classification of these skills. Rating scales, situational judgment tests, performance assessments and computer simulations, histories of skills and abilities, portfolios and instruments that include different types of items (multiple choice, computer supported and open-ended items) may be used for measuring such skills (Kylonen, 2012; Soland *et al.*, 2013)(*as cited in Yalcin (2018)*).

The concept of skill, which may be defined as “being capable, mastery, ingenuity or the ability to accomplish a job and to fulfill a procedure properly depending on one's predisposition and education, dexterity” in lexical terms, is discussed with its different forms and dimensions in different fields. The skills required for individuals to meet the expectations of the century they live in are today called 21st century skills. The 21st century skills that refer to higher-order skills and learning tendencies that need to be improved in order to succeed in the information age are abilities that include both knowledge and skills and consist of a blending of these two concepts (Dede, 2010). Such skills, which aim for learning processes within schools to be maintained throughout life, are also considered to be essential for the learning-teaching process. In this context, educational curricula and practices that have been continuously changing and evolving since the initial Republican Period have also been demonstrated to tend to get closer to daily life skills by various studies (Bayburtlu, 2015; Alver and Sancak, 2016; Aydın, 2017; Bal, 2018).

Learning and innovation skills consist of four skills (4C): 1) critical thinking and problem-solving, 2) communication, 3) collaboration and 4) creativity (Partnership for 21st Century Learning (P21), 2007; Trilling and Fadel, 2009; Kylonen, 2012). These skills are regarded as the key to lifelong learning and creative thinking (Trilling and Fadel, 2009 as cited in Yalcin (2018)). It may be stated that 21st century skills correspond to the characteristics of this century's information society that help individuals become good citizens and competent employees (Ananiadou and Claro, 2009). However, the key skills that are used refer to development of a form of

cognitive, behavioral or emotional mastery not only in school life but also beyond school. Skills are not only technically addressed. They may be general, but they also cover some complex forms of expertise. This comprehensive definition of skills allows one to consider the diversity of tendencies, knowledge and abilities a student should have to exhibit a particular form of mastery (Lamb, Maire, and Doecke, 2017 as cited in Cansoy (2018)). This study was conducted to raise awareness about 21st century learner and teacher skills and offer various recommendations for helping people gain these skills, by examining the extent to which preservice teachers who would be educators of the future use these skills in terms of different variables.

2. Materials and Methods

2.1. Research Model

This study was a correlational survey carried out to examine the relationship between preservice teachers' use of 21st century learner and teacher skills.

2.2. Population and Sample

The population consisted of preservice teachers studying at a state university located in the Eastern Anatolia Region of Turkey in the spring semester of the academic year of 2018–2019. The sample consisted of 445 preservice teachers determined by using the simple random sampling method from among the departments determined based on the cluster sampling method.

Table 1 presents information on the demographic characteristics of the sample.

Table-1. Information on the demographic characteristics of the sample.

| Variables | Characteristics | f | % |
|-----------------------------|--------------------------------------|-----|-------|
| Gender | Female | 302 | 67.9 |
| | Male | 143 | 32.1 |
| Total | | 445 | 100.0 |
| Grade | Freshmen | 154 | 34.6 |
| | Sophomore | 117 | 26.3 |
| | Junior | 102 | 22.9 |
| | Senior | 72 | 16.2 |
| Total | | 445 | 100.0 |
| Maternal educational status | Illiterate | 255 | 57.3 |
| | Elementary School | 90 | 20.2 |
| | Secondary School | 52 | 11.7 |
| | High School | 48 | 10.8 |
| Total | | 445 | 100.0 |
| Paternal educational status | Illiterate | 144 | 32.4 |
| | Elementary School | 105 | 23.6 |
| | Secondary School | 118 | 26.5 |
| | High School | 74 | 16.6 |
| | University | 4 | .9 |
| Total | | 445 | 100.0 |
| Department | Turkish Language Education | 258 | 58.0 |
| | Early Childhood Education | 95 | 21.3 |
| | Physical Education Teacher Education | 92 | 20.7 |
| Total | | 445 | 100.0 |

2.3. Data Collection Instruments

Two data collection instruments were used to collect data during the study.

2.3.1. 21st Century Learner Skills Use Scale

The “21st Century Learning Skills Use Scale” developed by Orhan (2016) was used in this study. The scale consists of 31 items and four factors, which was cognitive skills, autonomous skills, collaboration and flexibility skills and innovation skills. The Cronbach's alpha reliability coefficient calculated for the whole scale was .915 in this study.

2.3.2. 21st Century Teacher Skills Use Scale

The “21st Century Teacher Skills Use Scale” developed by Orhan (2016) was used as the second data collection instrument in this study. This scale consisting of 27 items was prepared as a 5-point Likert-type scale and has 5 factors. The scale has the following dimensions: “Managerial skills” (12 items), “Techno-pedagogical skills” (8 items), “Affirmation skills” (3 items), “Flexible teacher skills” (2 items) and “Production skills” (2 items). The Cronbach's alpha reliability coefficient was calculated as .885 in this study.

2.4. Data Analysis

Before data analysis, it was checked to see if the data were distributed normally. In cases where the data were normally distributed, independent-samples t-tests were carried out to compare pairs of groups, and one-way analyses of variance were carried out to compare more than two groups. Non-parametric tests were preferred in the analysis of some of the variables due to the small number of people corresponding to the variables in the data set. Pearson's product-moment correlation coefficients were used to determine the relationships between pairs of continuous variables.

3. Results

Table 2 presents the data obtained as a result of the analyses of the independent-samples t-tests to determine whether the preservice teachers' mean scores on 21st century learner and teacher skills use differed depending on the variable of gender.

Table-2. Results of the independent-samples t-tests regarding whether the preservice teachers' mean scores on 21st century learner and teacher skills use differed depending on the variable of gender.

| Variable | Group | N | Mean | sd | df | t | p |
|----------------|--------|-----|------|------|-----|--------|------|
| Learner skills | Female | 302 | 3.90 | 4.94 | 443 | -1.138 | .256 |
| | Male | 143 | 3.84 | 4.90 | | | |
| Teacher skills | Female | 302 | 4.17 | 4.21 | 443 | -4.522 | .000 |
| | Male | 143 | 3.98 | 4.44 | | | |

Table 2 shows that, according to the independent-samples t-test results, there was no significant difference in the preservice teachers' mean scores on 21st century learner skills depending on the variable of gender, whereas there was a significant difference in their mean scores on 21st century teacher skills [$t_{21st\ century\ learner\ skills\ (443)} = -1.138, p > .05$; $t_{21st\ century\ teacher\ skills\ (443)} = -4.522, p < .05$]. It was understood that the significant difference in the preservice teachers' mean scores on 21st century teacher skills was in favor of the female participants ($M_{Female} = 4.17$; $M_{Male} = 3.98$)

A one-way ANOVA test was carried out to determine whether the preservice teachers' mean scores on 21st century learner and teacher skills use differed depending on the variable of class year. Table 3 shows the descriptive statistics.

Table-3. Descriptive statistical data on the scores on 21st century learner and teacher skills use by the variable of class year.

| Skills | Class year | N | Mean | SD |
|----------------|------------|-----|------|-----|
| Learner skills | Freshmen | 154 | 3.71 | .43 |
| | Sophomore | 117 | 3.88 | .50 |
| | Junior | 102 | 3.97 | .45 |
| | Senior | 72 | 4.13 | .53 |
| | Total | 445 | 3.88 | .49 |
| Teacher skills | Freshmen | 157 | 4.03 | .43 |
| | Sophomore | 117 | 4.14 | .47 |
| | Junior | 102 | 4.15 | .37 |
| | Senior | 72 | 4.18 | .46 |
| | Total | 445 | 4.11 | .44 |

Table 3 shows the preservice teachers' mean scores on 21st century learner and teacher skills use depending on the variable of class year. Table 4 shows the results of the one-way ANOVA carried out to determine whether the preservice teachers' mean scores on 21st century learner and teacher skills use differed depending on the variable of class year.

Table-4. Results of one-way ANOVA on whether there was a difference in the mean scores on 21st century learner and teacher skills use depending on the variable of class year.

| Skills | Variance origin | Sum of squares | DF | Mean squares | F | p | Significant difference |
|----------------|-----------------|----------------|-----|--------------|--------|------|---------------------------|
| Learner skills | Between groups | 9.604 | 3 | 3.201 | 14.376 | .000 | 4 > 1.2 3 > 1 2 > 1 |
| | Within groups | 98.203 | 441 | .223 | | | |
| | Total | 107.807 | 444 | | | | |
| Teacher skills | Between groups | 1.720 | 3 | .573 | 3.029 | .029 | 4 > 1 |
| | Within groups | 83.502 | 441 | .189 | | | |
| | Total | 85.222 | 444 | | | | |

Table 4 shows that the preservice teachers' mean scores on 21st century learner and teacher skills use differed significantly depending on the variable of class year ($F_{Learner\ Skills\ (3, 441)} = 14.376, p < .05$; $F_{Teacher\ Skills\ (3, 441)} = 3.029, p < .05$). Tukey's multiple comparison test results showed that the significant differences in the 21st Century Learner Skills Use scale were between the senior students ($M = 4.13$) and the freshmen students ($M = 3.71$) and between the senior students ($M = 4.13$) and the sophomore students ($M = 3.88$) in favor of the senior students; between the junior students ($M = 3.97$) and the freshmen students ($M = 3.71$) in favor of the junior students, and between the sophomore students ($M = 3.88$) and the freshmen students ($M = 3.71$) in favor of the sophomore students. These results may be interpreted as that the use of 21st century learner skills of the participants increased as their class years increased. It was seen that the significant difference in the 21st Century Teacher Skills Use scale was between the senior students ($M = 4.18$) and the freshmen students ($M = 4.03$) in favor of the senior students. This result may be interpreted as that the senior students used 21st century teacher skills more frequently than the freshmen students.

A one-way ANOVA test was carried out to determine whether the preservice teachers' mean scores on 21st century learner and teacher skills use differed depending on the variable of maternal educational status. Table 5 shows the descriptive statistics.

Table-5. Descriptive statistical data on the scores on 21st century learner and teacher skills use by the variable of maternal educational status.

| Skills | Education Status | N | Mean | SD |
|----------------|-------------------|-----|------|-----|
| Learner skills | Illiterate | 255 | 3.88 | .51 |
| | Elementary School | 90 | 3.91 | .48 |
| | Secondary School | 52 | 3.94 | .45 |
| | High School | 48 | 3.76 | .48 |
| | Total | 445 | 3.88 | .49 |
| Teacher skills | Illiterate | 255 | 4.10 | .42 |
| | Elementary School | 90 | 4.14 | .42 |
| | Secondary School | 52 | 4.13 | .45 |
| | High School | 48 | 4.10 | .54 |
| | Total | 445 | 4.11 | .44 |

Table 5 shows the preservice teachers' mean scores on 21st century learner and teacher skills use depending on the variable of maternal educational status. Table 6 shows the results of the one-way ANOVA carried out to determine whether the preservice teachers' mean scores on 21st century learner and teacher skills use differed depending on the variable of maternal educational status.

Table-6. Results of one-way ANOVA on whether there was a difference in the mean scores on 21st century learner and teacher skills use depending on maternal educational status.

| Skills | Variance origin | Sum of squares | DF | Mean squares | F | p |
|----------------|-----------------|----------------|-----|--------------|-------|------|
| Learner skills | Between groups | 1.017 | 3 | .339 | 1.400 | .242 |
| | Within groups | 106.790 | 441 | .242 | | |
| | Total | 107.807 | 444 | | | |
| Teacher skills | Between groups | .163 | 3 | .054 | .282 | .839 |
| | Within groups | 85.059 | 441 | .193 | | |
| | Total | 85,222 | 444 | | | |

Table 6 shows that the preservice teachers' mean scores on 21st century learner and teacher skills use did not differ significantly depending on the variable of maternal educational status ($F_{\text{Learner Skills (3, 441)}} = 1.400, p > .05$; $F_{\text{Teacher Skills (3, 441)}} = 0.282, p > .05$).

Table 7 shows the results of the Kruskal Wallis test carried out to determine whether the preservice teachers' mean scores on 21st century learner and teacher skills use differed depending on the variable of paternal educational status.

Table-7. Results of Kruskal Wallis test on whether there was a difference in the mean scores on 21st century learner and teacher skills use depending on paternal educational status.

| Skills | Education status | n | Mean rank | df | Chi-square | p |
|----------------|-------------------|-----|-----------|----|------------|------|
| Learner skills | Illiterate | 144 | 211.39 | 4 | 2.723 | .605 |
| | Elementary School | 105 | 219.92 | | | |
| | Secondary School | 118 | 231.88 | | | |
| | High School | 74 | 233.51 | | | |
| | University | 4 | 265.25 | | | |
| | Total | 445 | | | | |
| Teacher skills | Illiterate | 144 | 204.53 | 4 | 7.847 | .097 |
| | Elementary School | 105 | 217.54 | | | |
| | Secondary School | 118 | 230.97 | | | |
| | High School | 74 | 253.74 | | | |
| | University | 4 | 227.13 | | | |
| | Total | 445 | | | | |

Table-8. Descriptive statistical data on the scores on the 21st century learner and teacher skills use by the variable of department.

| Skills | Departments | N | Mean | SD |
|----------------|--------------------------------------|-----|------|-----|
| Learner skills | Turkish Language Education | 258 | 3.91 | .52 |
| | Early Childhood Education | 95 | 4.02 | .45 |
| | Physical Education Teacher Education | 92 | 3.67 | .39 |
| | Total | 445 | 3.88 | .49 |
| Teacher skills | Turkish Language Education | 258 | 4.13 | .48 |
| | Early Childhood Education | 95 | 4.15 | .39 |
| | Physical Education Teacher Education | 92 | 4.01 | .36 |
| | Total | 258 | 4.11 | .44 |

Table 7, which shows the results of the Kruskal Wallis test carried out to determine whether the preservice teachers' mean scores on 21st century learner and teacher skills use differed depending on the variable of paternal educational status, showed that neither learner skills nor teacher skills use differed depending on paternal educational status [$\chi^2_{\text{Learner Skills (4)}} = 2.723, p > .05$; $\chi^2_{\text{Teacher Skills (4)}} = 7.847, p > .05$].

A one-way ANOVA test was carried out to determine whether the preservice teachers' mean scores on 21st century learner and teacher skills use differed depending on the variable of department. Table 8 shows the descriptive statistics.

Table 8 shows the preservice teachers' mean scores on 21st century learner and teacher skills use depending on the variable of department. Table 9 shows the results of the one-way ANOVA carried out to determine whether the preservice teachers' mean scores on 21st century learner and teacher skills use differed depending on the variable of department.

Table-9. Results of one-way ANOVA on whether there was a difference in the mean scores on 21st century learner and teacher skills use depending on the variable of department.

| Skills | Variance origin | Sum of squares | SD | Mean squares | F | p | Significant difference |
|----------------|-----------------|----------------|-----|--------------|--------|------|---|
| Learner skills | Between groups | 5.976 | 2 | 2.988 | 12.970 | .000 | Turkish Language Education > Physical Education Early Childhood Education > Physical Education |
| | Within groups | 101.831 | 442 | .230 | | | |
| | Total | 107.807 | 444 | | | | |
| Teacher skills | Between groups | 1.199 | 2 | .599 | 3.153 | .054 | |
| | Within groups | 84.023 | 442 | .190 | | | |
| | Total | 85.222 | 444 | | | | |

Table 9 shows that the preservice teachers' mean scores on 21st century learner and teacher skills use differed significantly depending on the variable of department in terms of learner skills use ($F_{\text{Learner Skills (2, 442)}} = 12.970$, $p < .05$), but they did not differ in terms of teacher skills use ($F_{\text{Teacher Skills (2, 442)}} = 3.153$, $p > .05$). Tukey's multiple comparison test results showed that the significant differences in the 21st Century Learner Skills Use scale were between the Turkish Language Education students ($M = 3.91$) and the Physical Education Teacher Education students ($M = 3.67$), in favor of the Turkish Language Education students, and between the Early Childhood Education students ($M = 4.02$) and Physical Education Teacher Education students ($M = 3.67$), in favor of the Early Childhood Education students.

The data on the Pearson's product-moment correlation coefficients to determine the correlation between the preservice teachers' uses of 21st Century learner and teacher skills are presented in Table 10.

Table-10. The correlation between the uses of 21st century learner and teacher skills.

| Skills | Test | Learner skills | Teacher skills |
|----------------|-----------------------|----------------|----------------|
| Learner skills | Pearson's correlation | | .645** |
| | p | | .000 |
| Teacher skills | Pearson's correlation | .645** | |
| | p | .000 | |

Table 10 shows that there was a positive significant correlation between the use of 21st century learner skills and the use of 21st century teacher skills [$r = .645$, $n = 445$, $p < .01$].

4. Discussion, Conclusions and Recommendations

Rapid developments in science and technology and reflection of these developments on social life force today's societies to improve themselves in this direction. In the 21st century, which has been a transition from the industrial age to the information age, it is expected that people have the ability to transform, question and implement information by going beyond just knowing. What is considered as the most important factor in the success of societies to achieve their goals of the future is to meet their need for qualified human resources provided by people who are equipped to meet the needs of the era, have strength in communication, knowledge and skills, can take responsibility, can evaluate themselves, those around them and time, can generate solutions not problems and are in good agreement with their environment. In this regard, it is important to raise awareness about 21st century learner and teacher skills to make plans and programs for their acquisition and to integrate them with the fields of science and education.

This study was conducted to examine preservice teachers' 21st century learner and teacher skills and showed that the participants frequently used 21st century learner and teacher skills, and their uses of learner and teacher skills were significantly and positively correlated. A review of the literature showed that this result was similar to the results of the studies conducted by Günüç *et al.* (2013), Bozkurt and Cakır (2016) and Onür and Kozikoğlu (2019). Researchers studying preservice teachers and elementary/secondary school students have demonstrated that students generally perceive 21st century learning skills to a great extent, and they are highly competent in skills such as creativity, active learning, problem-solving, learning to learn, collaboration, digital citizenship, communication and similar skills, which are considered as 21st century learner and teacher skills, and they are moderately competent in some others. It is very important and promising that preservice teachers, who are the educators of the future, are familiar with and using a significant amount of these skills.

This study was carried out on 445 preservice teachers: 302 females, 143 males; 154 freshmen, 117 sophomores, 102 juniors and 72 seniors; and 258 in Turkish Language Education, 95 in Early Childhood Education and 92 in Physical Education Teacher Education. When the variables were examined, it was seen that there was no significant difference based on the maternal/paternal educational status variables. Although the results of Kan'an (2018) study paralleled this result of this study, it was concluded based on the literature review that the students whose parents were highly educated were using their 21st-century learning skills to a greater extent than those whose parents had lower levels of education, in terms of 21st century learning skills overall and in terms of the

dimensions of these skills. Eskicumali and Eroğlu (2001), Ciftçi and Bal (2015), Canakçı and Ozdemir (2015) and Onür and Kozikoğlu (2019) found that the higher the level of education of parents, the higher the problem-solving skills and course achievements of students, and such parents can contribute more to their children's educational lives.

In terms of the variable of class year, a positive correlation was identified between the class years in favor of the senior students in all departments. This result may be interpreted as that the use of 21st century learner skills of the students increased as their class years increased. In terms of the 21st Century Teacher Skills Use scale, it was understood that the significant difference was in favor of the senior students. This result may be interpreted as that the senior students used 21st century teacher skills more frequently than the freshmen students. However, according to Basturk (2011) and Bozkurt and Cakır (2016), the extent to which these skills are used decreases similarly in female and male students as the class years increase. Especially senior students appear to prefer shorter and more practical methods in order to be successful in the high school entrance exams in the current system. They interpret this as a tendency of students to perform imitative reasoning without thinking, understanding or evaluating a problem or subject they encounter.

There was no significant difference in the preservice teachers' mean scores on 21st century learner skills use depending on the gender variable, whereas there was a significant difference in their mean scores on 21st century teacher skills use in favor of the female participants. Many studies have been conducted on the relationship between gender and learner/teacher skills, and in the majority of such studies, female students have been found to be more proficient and successful than male students in many areas, whereas the results have been in favor of male students in certain areas (Ozkal and Cetingöz, 2006; Bozkurt and Cakır, 2016; Kan'an, 2018; Onür and Kozikoğlu, 2019). It was found that the female students scored better than the male students on the 21st Century Learner Skills Use scale overall and on all its dimensions, and the female students were able to use their 21st century learner and teacher skills more effectively than the male students and were more open to collaboration. Contrary to these results, Mercan (2011) found that male students' skills for learning to learn were better than those of female students, and Ozbulak *et al.* (2011) determined that the problem-solving skills of 9th-grade students did not differ significantly based on gender. Although different results may be found in the literature with regard to the use of 21st century learner/teacher skills based on gender, it may be stated that female students are more capable in terms of such skills than male students in general. In this case, it is also possible to say that female students are more capable in skills such as being active in the teaching-learning process, knowing ways to access information and self-directed learning in comparison to male students (Onür and Kozikoğlu, 2019).

The preservice teachers' mean scores on 21st century learner and teacher skills use differed significantly depending on the department variable in terms of their learner skills use, in favor of the Turkish Language Education, Early Childhood Education and Physical Education preservice teachers, in the order given, but did not differ in terms of 21st century teacher skills use. This study is limited to preservice teachers studying at the Turkish Language Education, Early Childhood Education and Physical Education Departments of the Kazım Karabekir Faculty of Education at Atatürk University in the province of Erzurum in Turkey. Considering the scarcity of studies available on the topic in the literature, it is recommended to carry out studies in different provinces, districts, schools and on different samples (elementary school, secondary school, high school students, teachers, administrators, and so forth). It is obvious that more work is needed in terms of quality and quantity, in terms of addressing the learner and teacher skills of the 21st century. Consequently, versatile studies on this subject, which may be utilized to structure and implement educational curricula, should be carried out on different experiment and control groups and to resolve sub-problems. It will also be useful to investigate the factors influencing students' 21st century skills development in the instructional process and conduct research on which methods and strategies may bring the missing skills.

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