

## Investigation of the Learning and Teaching Processes of the Primary School Pre-service Teachers with High and Low 21<sup>st</sup> Century Teaching Skills \*

### 21. Yüzyıl Öğreten Becerileri Yüksek ve Düşük Olan Sınıf Öğretmeni Adaylarının Öğrenme Öğretme Süreçlerinin İncelenmesi

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**ABSTRACT:** The aim of this study is to examine the learning and teaching processes of primary school pre-service teachers with high and low 21<sup>st</sup> century teaching skills. The study group of the study, in which the qualitative research method was used, consists of eight primary school pre-service teachers studying in the last year of a XXX University Education Faculty. The 21<sup>st</sup> Century Teaching Skills Scale was applied to determine the pre-service teachers in the study group and the assessments of the participants of the teaching practice courses of the group were consulted. The data sources of the research are consist of the lesson plans and online lesson records created by each pre-service teacher in the study group. The data obtained in the study were analysed by content analysis. As a result of the study, it was determined that the primary school pre-service teachers with high 21<sup>st</sup> century teaching skills prepared their lesson plans in more detail and were better equipped in terms of activities, materials, techniques and strategies. In addition, it was determined that these pre-service teachers exhibited more effective behaviours in terms of classroom management and communication, and preferred to use teaching activities and assessment activities by diversifying them.

**Keywords:** 21<sup>st</sup> century teaching skills, learning teaching process, primary school pre-service teacher.

**ÖZ:** Bu araştırmanın amacı 21. yüzyıl öğrenen becerileri yüksek ve düşük sınıf öğretmeni adaylarının öğrenme öğretme süreçlerini incelemektir. Nitel araştırma yönteminin kullanıldığı araştırmanın çalışma grubunu XXX Üniversitesi Eğitim Fakültesi son sınıfta öğrenim gören sekiz sınıf öğretmeni adayı oluşturmaktadır. Çalışma grubunda yer alan öğretmen adaylarının belirlenmesi için “21.Yüzyıl Öğreten Becerileri Ölçeği” uygulanmış ve belirlenen grubun öğretmenlik uygulaması derslerini yürüten öğretim üyelerinin öğretmen adaylarının 21. yüzyıl öğrenen becerileri yeterliklerine ilişkin değerlendirmelerine başvurulmuştur. Araştırmanın veri kaynaklarını, çalışma grubunda yer alan her bir öğretmen adayının oluşturduğu ders planları ve uzaktan eğitim ders kayıtları oluşturmaktadır. Araştırmada elde edilen veriler içerik analizine tabi tutulmuştur. Araştırma sonucunda 21.yüzyıl öğrenen becerileri yüksek sınıf öğretmeni adaylarının ders planlarını daha ayrıntılı hazırladıkları, etkinlik, materyal, teknik ve strateji kullanımı açısından daha donanımlı oldukları tespit edilmiştir. Ayrıca bu öğretmen adaylarının sınıf yönetimi ve iletişim bakımından daha etkili davranışlar sergiledikleri, öğretim faaliyetlerini ve ölçme değerlendirme etkinliklerini çeşitlendirerek kullanmayı tercih ettikleri belirlenmiştir.

**Anahtar kelimeler:** 21.yüzyıl öğrenen becerileri, öğrenme öğretme süreci, sınıf öğretmeni adayı.

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Developments in science and technology and globalisation cause changes in the field of education as in every field of life. This change covers various phenomena from the physical and technological equipment of educational institutions to the competences of educators. This change is also reflected in the skills aimed to be developed in students and the roles of teachers and students. In other words, in today's world where the information and technology age is experienced, the perspective on many phenomena related to education has changed.

In addition to basic skills such as adapting to the changes that occur, catching up with technology, obtaining information by selecting, analysing and evaluating information among the masses of rapidly produced information, using the obtained information in daily life and transforming it into products, having higher order thinking skills and competencies makes it easier for the individual to keep up with the age (Aygün et al., 2016). These skills and competences can be defined as 21<sup>st</sup> century skills. Many studies and projects have been carried out to define 21<sup>st</sup> century skills.

Assesment & Teaching of 21<sup>st</sup> Century Skills (ACTS 21), North Central Regional Educational Laboratory (NCREL), International Society for Technology in Education (ISTE), Partnership for 21<sup>st</sup> Century Learning (P21), Organization for Economic Co-operation & Development (OECD), European Commission (EC), and Asia-Pacific Economic Cooperation (APEC) classified them in different ways. However, some skills are common and prominent in all these frameworks. These include new skills of literacy such as information, digital media literacies. In addition, creativity and productivity, problem solving, critical thinking, effective communication, collaborative working, social & cultural skills, and learning to learn are among these skills (APEC, 2008; EC, 2018; Griffin & Care, 2014; Metiri Group & NCREL, 2003; NETS/ISTE, 2016; OECD, 2005; P21, 2009b).

Individuals can acquire competences and skills appropriate to the requirements of the age only through education. In order to achieve this, qualified curricula and competent teachers are needed. In this context, 21<sup>st</sup> century skills have become a key focus of education reforms globally, with many countries incorporating them into their curricula. (Adamson & Darling-Hammond, 2015; MoNE Ontario, 2010; MoNE Singapore 2010; Gelen, 2017; OECD, 2010; Søreide et al., 2021; Sabag & Cohen, 2022; Griffin et al., 2012; Martinez, 2022; TTKB, 2017).

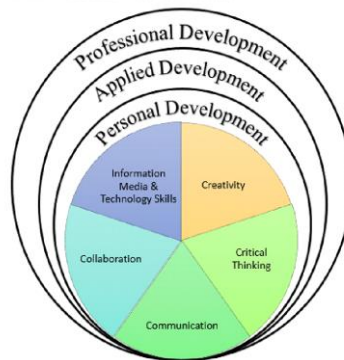
However, renewal of curricula is not enough to equip students with the competencies and skills appropriate to the requirements of the new era. Teacher competences are also an extremely important element in ensuring this. Because teachers play a vital role in improving the quality of education, especially in addressing the challenges of global change in the 21<sup>st</sup> century (Utami & Hasanah, 2020). In this context, 21<sup>st</sup> century teachers are expected not only to provide learners with content and assess them, but also to be able to carry out learning-teaching processes in a way that enables action oriented, learner-centered, and transformative learning (UNESCO, 2017; UNESCO, 2020). In fact, 21<sup>st</sup> century teachers' competencies related to attitude and behaviour such as being a guide, having interpersonal communication skills, knowing student characteristics are more important than professional knowledge such as classroom management, content knowledge, and pedagogical content knowledge (Tingil, et al., 2023). It is also important for teachers to develop communication skills, collaboration, creative and innovative practices and information & communication

technology (ICT) literacy to foster interactive learning and, ultimately, enhance the quality of teaching (Hatlevik, 2016; Omar & Ismail, 2020; Palmer, 2015; Sulaiman & Ismail, 2020; Van Laar et al., 2017).

In this context, Saavedra and Opfer (2012) stated that 21<sup>st</sup> century teachers should employ nine key principles in their teaching and learning processes. These include making learning relevant, teaching through the disciplines, and developing students' thinking skills. Teachers should also encourage learning transfer and teach students how to learn by promoting metacognitive strategies. Addressing misunderstandings directly is essential to ensure accurate comprehension. Additionally, educators should treat teamwork as a valuable outcome, exploit technology to support learning, and foster creativity to prepare students for the demands of the modern world.

Urbani et al., (2017) also pointed out that creative thinking, critical thinking, collaboration, communication, and information, media and technology skills of 21<sup>st</sup> century teachers should be developed through teacher education programmes and presented the model in Figure 1.

Figure 1: Model for developing 21<sup>st</sup> century skills in teacher education programs



(Urbani et al., 2017).

This model proposes developing the targeted skills through three stages. **Personal Development:** Building preservice teachers' capacity to understand and apply these skills in various contexts beyond educational settings. **Applied Development:** Expanding individual capacity while fostering skill development in students during supervised teaching fieldwork. **Professional Development:** Continuously enhancing these skills when working with students, colleagues, parents, and administrators as in-service teachers.

Beside this model Orhan Göksun & Kurt (2017) examined the level of pre-service teachers' use of 21<sup>st</sup> century teaching skills in five dimensions and defined these dimensions as 'managerial skills'; 'technopedagogical skills'; 'affirmative skills', 'flexible teaching skills' and 'generative skills'. Managerial skills refer to pre-service teachers' skills such as classroom management, process and activity management, assignments and assessments. Technopedagogical skills refer to the skills that emerge when technology and pedagogical skills are employed together. Affirmative skills are defined as the display of approaches that affirm targetted behaviours by transforming them into teaching skills. Flexible teaching skills refer to the skills that make teaching independent from the classroom environment. Generative skills refer to the material,

activity and assessment tools production skills of pre-service teachers (Orhan Göksun, 2016).

When all these studies are examined, it is seen that 21<sup>st</sup> century teachers are expected to structure the learning-teaching process based on action-oriented, learner-centered, transformative learning, collaborative. They are also expected to realize meaningful learning, to guide students in the learning process, and to develop students' higher order skills (HOT). Beside these 21<sup>st</sup> century teachers are expected to have interpersonal communication skills, generative skills, managerial skills, affirmative skills, flexible skills, technopedagogical competencies, and ICT literacy skills.

A review of the literature reveals that many studies focus on assessing the 21<sup>st</sup> century teaching skill levels of both teachers and preservice teachers (Aydemir et al., 2020; Demirtaş & Özer, 2007; Erten, 2022; Gürültü et al., 2019; İncik, 2020; Korkmaz, 2019; Kıyasoglu & Çeviker Ay, 2020; Kozikoğlu & Özcanlı, 2020; Murat, 2018; Nuhoglu & Seçkin, 2021; Orhan Göksun & Kurt, 2017; Özdemir, 2023). These studies revealed that the use of 21<sup>st</sup> century teaching skills by teachers and pre-service teachers was above the middle level. Additionally, when examining 21<sup>st</sup> century teaching skills based on gender, Orhan Göksun (2016) found a significant difference, with female teachers demonstrating higher skill levels. Murat (2018), Aydemir et al., (2020), Sulaiman and Ismail, (2020), and Erten (2022) determined that gender is not a variable that makes a difference in 21<sup>st</sup> century teaching skills. Valtonen et al. (2021) investigated how pre-service teachers' learning skills, collaboration dispositions, and ICT competencies evolved during their university education. As a result of the research, it was determined that while there was no significant change in the learning skills and collaboration dispositions of the pre-service teachers, their skills related to the use of ICT increased.

In summary, it is emphasised in the literature that teachers should have 21<sup>st</sup> century teaching skills in to improve the standard of education and to conduct more interactive and learner-centred studies (Hatlevik, 2016; Omar and Ismail, 2020; Sulaiman et al., 2020; UNESCO, 2017; Van et al., 2017). For this, it is necessary to focus on pedagogy and curricula that will ensure skill acquisition (Martinez, 2022). These programmes should also be learner-centred (Palmer, 2015). In this context, a learner-centred education model has been presented for the improvement of teachers' 21<sup>st</sup> century teaching skills (Urbani et al., 2017; Michaels et al., 2015). Various studies have explored teachers' proficiency in 21<sup>st</sup> century teaching skills. However, there is no research that provides concrete findings on how the presence or lack of 21<sup>st</sup> century teaching skills is reflected in the learning teaching process. In addition, today, there are many situations that make it compulsory to carry out education and training activities online. Examples of these situations are the Covid 19 pandemic and natural disasters such as earthquake and fire. The revolutionary developments in instructional technologies prepare a suitable ground for online education activities to be carried out online even outside of compulsory situations. This situation can be considered as an indicator of the potential for online education to become widespread in the future. In this context, the research is carried out with the aim of examining the online learning teaching processes of pre-service teachers with high and low competencies related to 21<sup>st</sup> century teaching skills and determining the differences, if any. The research is expected to provide results that will contribute to the teacher training system and current

practices and the research is considered valuable in this respect. The research questions are listed as:

1. How do pre-service primary school teachers with low and high levels of 21<sup>st</sup> century teaching skills plan the learning teaching process? Does their planning differ? If so how?
2. What kind of practices do pre-service primary school teachers with low and high level of 21<sup>st</sup> century teaching skills do in the online learning teaching process? Do these practices differ? If so how?

## **Methodology**

### **Research Design**

This research, which aims to examine the learning teaching processes of pre-service primary school teachers with high and low 21<sup>st</sup> century teaching skills levels, was designed as a comparative case study. Case studies are defined as a method in which one or more cases, environments, programmes or other interconnected systems are examined in depth (Christensen et al., 2015; Lester and Lochmiller, 2017; McMillan, 2000). This research design is employed to identify and analyze the details of a case, develop potential explanations for it, and conduct a comprehensive evaluation. (Büyüköztürk et al., 2016, p. 260). In comparative case studies, there are two or more cases. These situations are analysed in depth and compared to determine changes and similarities (Christensen et al., 2015). In this study, the research design was determined as a comparative case study since two groups of pre-service primary school teachers with high and low characteristics in terms of 21<sup>st</sup> century teaching skills were examined. In the study, in order to provide in-depth analysis, multidimensional data collection was employed and the lesson plans and course records of the participants were analysed.

### **Study Group**

The participants of the study consisted of eight pre-service teachers with high (4) and low (4) 21<sup>st</sup> century teaching skills, who were determined by the outlier sampling technique, one of the purposeful sampling methods, at a state university in Türkiye. A two-stage process was followed while determining the participants. In the first stage, the '21<sup>st</sup> Century Teaching Skills' scale was applied to 43 pre-service teachers studying in the fourth grade of the primary teaching program (Orhan Göksun & Kurt, 2017). This five-point Likert-type scale consisting of 27 items has a five sub-dimensional structure called as 'managerial skills'; 'technopedagogical skills'; 'affirmative skills', 'flexible teaching skills' and 'generative skills'. The scale is graded as always (5) and never (1). The highest score that can be obtained from the scale is 135, and the lowest score is 27. The scores obtained as a result of the application of the scale were ranked from low to high, and the significant difference between the scores of the students from 11 low and 11 high groups corresponding to 27% of the participants was examined and a significant difference was found between the groups.

In the second stage, the lecturers who conducted the 'Teaching Practice' course of these pre-service teachers were asked to evaluate them in terms of 21<sup>st</sup> century teaching skills. In this context, the participants were observed in the context of 21<sup>st</sup>



century teaching skills such as communication, collaboration, ICT literacy, and HOTS. Also their studies, homework, presentations, and reports were analysed in the context of generative skills. After these processes, a total of eight pre-service teachers, four with the highest and four with the lowest characteristics in terms of 21<sup>st</sup> century teaching skills, were determined as the participants of the study. Afterwards, the participants were informed about the purpose of the research and that their personal information would be kept confidential. All of the eight participants were included in the study voluntarily. Pre-service teachers with high 21<sup>st</sup> century teaching skills were coded as H1, H2, H3 and H4, and those with low 21<sup>st</sup> century teaching skills were coded as L1, L2, L3 and L4. Table 1 presents the demographic characteristics of the pre-service teachers who constitute the study group.

Table 1

*Demographic characteristics of the study group pre-service teachers*

Participants	Scale Score	Gender	Observed Skills				
			Communication	Collaboration	ICT Literacy	Generative Skills	Evoke HOTS
H1	127	F	Higher	Higher	Higher	Higher	Higher
H2	126	F	Higher	Higher	Higher	Higher	Higher
H3	126	F	Higher	Higher	Higher	Higher	Higher
H4	125	F	Higher	Higher	Higher	Higher	Higher
L1	110	F	Lower	Lower	Lower	Lower	Lower
L2	109	F	Lower	Lower	Lower	Lower	Lower
L3	109	F	Lower	Lower	Lower	Lower	Lower
L4	108	M	Lower	Lower	Lower	Lower	Lower

As seen in the Table 1 the participants with high characteristics scored between 127-125 on the scale. The ones with low characteristics scored between 108-110. Study group consists of seven female, one male pre-service teachers. According to the scores obtained from the scale, pre-service teachers in the high group have higher skills in the context of 21<sup>st</sup> century teaching skills defined as ‘managerial skills’, ‘technopedagogical skills’, ‘affirming skills’, ‘flexible teaching skills’ and ‘generative skills’. In this context, pre-service teachers with high managerial skills have the ability to use student-centered, transformative learning skills, to awake HOTS in students, and to make qualified assignment and evaluation in learning and teaching processes. Pre-service teachers with high technopedagogical skills have ICT literacy skills in addition to using technology and pedagogical skills together. Pre-service teachers with high affirmative skills exhibit skills in exhibiting affirmative approaches by transforming targeted behaviors into teaching skills as well as interpersonal communication skills. Flexible teaching skills include skills for planning social and educational activities in out-of-class learning environments including action oriented activities. Out of class learning includes also online learning settings. Lastly generative skills include the skill of producing original materials, activities and assessment tools for lessons. In this context, the demonstration of this skill requires higher order thinking skills such as critical thinking and creative

thinking as well as technopedagogical skills. According to academicians' observation, candidates in this group have higher skills in terms of communication skills, collaboration, ICT literacy, evoking students' HOTS and generativity. The pre-service teachers in the lower group are at a low level of proficiency in terms of the mentioned skills. All participants were undergoing teaching practice training at a primary school with a middle socioeconomic level, located in the city center of Gaziantep, Türkiye.

### **Data Sources**

In the study, lesson plans and observation (recorded online classes) were used as data sources to examine the practices of pre-service teachers with high and low 21<sup>st</sup> century teaching skills regarding the learning teaching process.

### **Lesson Plans**

With the lesson plans, the aim was to gather in-depth information about how pre-service teachers with both characteristics plan their learning and teaching processes. In this context, four lesson plans of each pre-service teacher were analysed. These plans were the plans of the observed lessons and included Maths, Turkish, Social Studies, Science and Music lessons.

### **Recorded Online Classes**

Observation according to the analysis framework based on MoNE Teaching Practice Assessment Form aimed to gather in-depth information on how preservice teachers demonstrated 21<sup>st</sup> century teaching skills in the learning and teaching process. This was achieved by examining their recorded instructional practices in a virtual classroom environment during teaching practice courses, with four lesson hours observed for each preservice teacher.

### **Data Collection Process**

In the study, data were collected in the spring semester of the 2020-2021 academic year. During this period, online education is carried out due to the Covid-19 outbreak. At the beginning of the process, the participants were informed about the purpose of the research and the studies to be conducted. Afterwards, the participants were asked to prepare lesson plans for four of the lessons they would teach within the scope of the teaching practice course and to record the lessons in which they implemented these plans. In this context, each lesson was asked to be planned for at least 30 minutes. First, lesson plans were collected from the participants and then the records of the lessons realized according to these plans were requested. The lessons were made online and recorded via Zoom. The data collection process took two months.

### **Data Analysis**

In the study, lesson plans and lesson videos of pre-service teachers with high and low 21<sup>st</sup> century teaching skills were analysed to determine the function of 21<sup>st</sup> century teaching skills in the learning teaching process. During the analysis, the components of the learning teaching process of the MoNE Teaching Practice Assessment Form were taken as reference (MoNE, 2019). In this form, the learning teaching process is analysed under three headings: teaching process, classroom management and communication.

Assessment was limited to the statement ‘2.11. To be able to use assessment techniques appropriate to the outcomes’ under the title of teaching process. However, it was thought that assessment was an important element that should be analysed separately in the learning teaching process. In this regard, the opinions of two experts from the fields of measurement and assessment, and curriculum and instruction were consulted and it was found appropriate to examine assessment as a separate dimension. In line with the expert opinions, the literature review on the main components of the learning teaching process and taking into consideration the dimensions of the MoNE Teaching Practice Assessment Form, the components of the analysis framework were determined as planning, teaching practices, classroom management, assessment and communication skills. Afterwards, lesson plans and lesson records were subjected to content analysis in an inductive way. The codes obtained were placed in this framework determined by a deductive approach. In this context, the codes were grouped into five themes that constitute the components of the analysis framework. As a result of the data analysis, a total of 38 codes were reached, including eleven codes each in the planning and teaching practices themes, six codes in the classroom management theme, and five codes each in the assessment and communication skills themes. While analysing the data, pre-service teachers with high 21<sup>st</sup> century teaching skills were coded as H1, H2, H3 and H4 and those with low 21<sup>st</sup> century teaching skills were coded as L1, L2, L3 and L4. The plans of these pre-service teachers were coded as H1P1 and their course records were coded as L2R4. For example, H1P1 refers to the first plan of pre-service teacher number one who has higher 21<sup>st</sup> century teaching skills. L2R4, on the other hand, refers to the fourth lesson record of second pre-service teacher who has lower 21<sup>st</sup> century teaching skills. The names of the students in the quotations are not the real names of the students, but the names chosen randomly by the researchers.

### **Validity and Reliability**

Since the research is a qualitative research, measures have been taken regarding the validity and reliability of the data analysis process. For this purpose, the study group, data collection and analysis process were presented clearly and in detail. The research results were confirmed through gathering data by different data collection methods such as lesson plans and camera records. All data were recorded in order to prevent data loss. Also inter-coder reliability was employed in data analysis. In this context, the researchers analysed the data set independently of each other. Then, the researchers came together and compared their coding and the inter-coder reliability coefficient was calculated according to the formula “Number of agreed codes / (Number of agreed codes + Number of disagreed codes) x 100” (Miles & Huberman, 1994). And this code is determined as .92. Afterwards, the codes on which there was disagreement were discussed and a consensus was reached. For the transparency and credibility, the study group, data collection and analysis process were presented clearly and in detail. The analyses were presented with quotations in the findings section.

### **Ethical Procedures**

The ethics committee permission of the research was obtained with the decision numbered 25 taken at the meeting of Gaziantep University Social and Human Sciences Ethics Committee dated 14.01.2022 and numbered 01.



## Results

In this section, the findings related to the planning and implementation of the learning teaching process of pre-service teachers with low and high 21<sup>st</sup> century teaching skills are presented comparatively under two main headings. First one is planning the learning teaching process and the second one is implementations in the learning teaching process. The findings related to the implementations in the learning teaching process were analysed under four sub-headings: teaching practices, classroom management, assessment, and communication.

### Planning the Learning Teaching Process

In this context, four lesson plans of pre-service teachers with low and high levels of 21<sup>st</sup> century teaching skills in terms of managerial skills, technopedagogical skills, flexible skills and generative skills were analysed in this heading. The total number of plans analysed was 32 in total, 16 from the low group and 16 from the high group. These plans are related to Mathematics, Turkish, Social Studies, Science, Music courses. Table 2 presents the findings related to the low and high study group pre-service teachers' planning of the learning teaching process according to the analysis according to the analysis framework based on MoNE Teaching Practice Assessment Form.

Table 2

#### *Findings Related to Planning*

Theme	Code	High (f)	Low (f)
Planning	Including technology	15	12
	Clear and understandable planning	15	10
	Including details	15	5
	Using various methods, techniques and strategies	15	2
	Using various materials	14	2
	Specifying activities	12	5
	Using various assessment methods	12	6
	Planning according to 5E model	12	0
	Including resources	8	0
	Linking to the previous lesson	1	2
	Non- assessment	0	8
Sum		119	52

Table 2 shows that both groups of pre-service teachers made clear and understandable plans and included the use of instructional technologies in their plans. Information on the use of technology was presented under the title of 'Instructional Technologies - Tools and Equipment Used' in the plans. These technologies are generally limited to zoom, powerpoint presentations and various web links. For

example, in H4P1, there are explanations about the use of technology as ‘*Natural and artificial sound sources (bird sound, rain sound, piano sound, horn sound) are briefly listened to the students in order*’.

<https://www.youtube.com/watch?v=Vj4FfG5a-xk>), rain sound

<https://www.youtube.com/watch?v=OE6zifMR570>), piano sound...

In L3P4, ‘word graphic pictures, computer, zoom, word questions’ explanations were given regarding the use of technology.

In Table 2, it is also seen that pre-service teachers with high 21<sup>st</sup> century teaching skills make more detailed plans, explain the activities, diversify the use of materials and create their plans according to the 5E planning model of the constructivist approach. In addition, pre-service teachers with high 21<sup>st</sup> century teaching skills also include diversity in the implementation of strategies, methods, techniques and the use of and assessment methods. This is due to their competent use of 21<sup>st</sup> century teaching skills such as managerial skills, generative skills and flexible skills in terms of planing online learning settings effectively. Brcause theseThese pre-service teachers also indicated the resources they used in their plans. Giving links to the bird and horn sounds to be listened to or explaining the source of the text or poem to be read can be given as examples of source indication. Examples of this are presented below.

‘Students are first made to read silently by opening the reading text titled ‘Bird Child’ from the MEB Turkish textbook. The poem ‘Commander-in-Chief Mustafa Kemal’ related to the objective of reading poetry is read by giving each student a stanza (H1P1).’

‘MoNE curriculum, MoNE textbook (H4P1).’

An excerpt from the plans in which the 5E model of the constructivist approach was used and the use of methods, techniques and strategies was diversified is given below.

**Engage:** Introduction to the new unit is made. Students' attention is drawn with preparation questions. Students are motivated to the lesson with the role-playing technique through the text in the textbook. Brainstorming is done with the students through the answers given to the review and preparation questions. A short exercise is done with the students about directions and their positions.

**Explore:** Students are encouraged to discuss the thought-provoking open-ended questions questions given on the ppt presentation and students are encouraged to explore the information.

**Explain:** In line with the questions and answers given, students are asked to explain the information they have comprehended. Then the teacher summarises the explanations and makes a short summary.

**Elobrate:** Practice questions are done with the students. Afterwards, Socratic questioning and brainstorming method is applied in line with the answers given.

**Evaluate:** A quizz is applied to the students and their learning is assessed.

**Methods, Techniques and Strategies:** Demonstration, Question-answer(Socratic questioning), Brainstorming, Visual reading, Role playing, Induction, *Deduction*, *Group discussion*” (H3P1).

In the plans of pre-service teachers with low 21<sup>st</sup> century teaching skills in terms of managerial, technopedagogical, flexible skills and generative skills, it is seen that the above-mentioned issues are rarely or not included at all. For example, it was determined that none of the plans of the pre-service teachers in this group applied the 5E model and did not include resources, and only two plans diversified the use of methods, techniques and materials. In addition, in half of the lesson plans of the pre-service teachers in this group, it is seen that there is no practice on the assessment of the achievement of the objectives at the end of the lesson. For example, in L3P4, there is the statement ‘

...assessment will not be made'. This is an indication that these pre-service teachers are unable to put managerial skills to work.

### Implementations in Learning Teaching Process

Under this title, the findings on how the learning teaching processes applied by pre-service teachers with low and high characteristics differed in the context of 21<sup>st</sup> century teaching skills defined as managerial skills, technopedagogical skills, affirmative skills, flexible teaching skills, generative skills, communication, collaboration, using ICT and evoking students' HOT skills are presented comparatively. The findings were obtained through the analysis of pre-service teachers' course records. While presenting the findings, they were presented under four sub-headings in line with the components of the analysis framework. These titles are teaching practices, classroom management, assessment and communication respectively.

#### Teaching Practices

Findings related to teaching practices in the learning teaching process are given in Table 3.

Table 3  
*Findings Related to Teaching Practices*

<i>Theme</i>	<i>Code</i>	<i>High (f)</i>	<i>Low (f)</i>
<i>Teaching Practices</i>	Utilization of technology	15	12
	Teaching according to the plan	15	12
	Giving reinforcement	15	10
	Diversification of method, technique and strategies	15	2
	Using time efficiently	15	7
	Linking the lesson with daily life	15	6
	Summarising what has been learned	15	5
	Asking thought-provoking questions	14	10
	Using various activities	13	8
	Using various materials	10	4
	Making corrections	7	7
<i>Sum</i>		159	83

As presented in Table 3, when the teaching practices of pre-service primary school teachers with low and high 21<sup>st</sup> century teaching skills in the learning teaching process are analysed, it is seen that both groups exhibit similar characteristics in practices such as using technology, teaching according to the plan and making corrections. What is meant by the use of technology is the use of activities and materials accessed from digital sources other than the textbook or created with WEB 2.0/ AI tools

while the pre-service teacher is teaching in the zoom virtual classroom environment in the distance education process. In this context, it is seen that the use of digital materials is at the forefront in both low and high groups, and activities created with WEB 2.0 tools are applied rarely. As examples of the use of technology; *'What are the benefits of knowing the directions? Does anyone want to play the role of Karagöz and Hacivat that I will project on the screen? .... Now let's do an activity with you. Look at the map. What is to the east of XXX? What's to the south? What's to the north? Let's find the missing parts in the statements projected on the screen together (H1R4).'* or *'There is a cartoon on the side, what do you see? There is a very nice cartoon here, let's first look at the picture and then the proverb. The cartoon and the proverb do not mean the same thing, right?(L1R3).'* may be given. In these examples, the use of technology is limited with use of digital materials accessed from digital sources. *'I prepared a game activity (via wordwall) to remind the lighting tools. Let's do that activity first. (L3R3).'* can be given as an example of technology-supported activities developed using WEB 2.0 tools. At this point, it is seen that although the technopedagogical competencies of pre-service teachers in the low and high groups differ, they exhibit similar performances in developing technology-supported learning materials.

Pre-service teachers with high 21<sup>st</sup> century teaching skills in terms of managerial skills, affirmative skills, evoking students' HOT skills and generative skills exhibit practices such as giving reinforcement, asking thought-provoking questions and using various activities more frequently than pre-service teachers in the low group. There are also significant differences between the groups with high and low 21<sup>st</sup> century teaching skills in diversifying methods, techniques and strategies, using time efficiently, linking the lesson with daily life, summarising what is learnt, diversifying activities, and using various materials in teaching. This may be due to the different levels of 21<sup>st</sup> century teaching skills such as managerial skills, generative skills, evoking students' HOT skills, flexible teaching skills, collaboration skills. While the high groups frequently use these practices in learning teaching processes, the low groups use these practices occasionally or rarely. For example, *'What would happen if there were no tools used for lighting in daily life? (H2R3).'* and *'What can be used to save money in daily life? For example, what can we do with stale bread? (H3R4)'* are aimed at both asking thought-provoking questions and linking what is learnt with daily life. *'What do you think is the settlement in the picture? (Time is given, answers are taken.) .... This is a picture of the reeve's office. Our reeve will give us information about the reeve system (H4R2).'* is an example of brain storming and collaborative work (inviting the reeve to the lesson). *'Can you read what was asked of us in the second activity? Let's listen to a song first. What does the song tell us about? Open the Turkish course workbook and fill in the blank. (H3R4).'* and *'I am reflecting the fill-in-the-blank activity on Okulistik education software. Who will answer the first question? Let's do an activity on the map. Which city is northwest of Konya?... (H1R4)* are examples of questioning, *'Now, we will sing the song together. ... (H2R1).'* and *"I prepared a game activity (via wordwall) to remind the lighting tools. Let's do that activity first in groups (L3R3)."* can be given as examples of collaborative work and educational games (wordwall activity). As seen in the examples, methods and techniques such as teamwork (inviting the head to the lesson), brainstorming, questioning, group work and educational games (word wall activity) were used in teaching practices, and digital and non-digital activities and materials

(textbook, digital visuals, music, maps, etc.) were utilized by high group more diversified.

### ***Classroom Management***

The findings related to the classroom management practices of pre-service teachers in the learning teaching process are presented in Table 4.

Table 4  
*Findings Related to Classroom Management*

<i>Theme</i>	<i>Code</i>	<i>High (f)</i>	<i>Low (f)</i>
<i>Classroom Management</i>	Ensuring effective participation	15	8
	Starting the lesson by drawing attention	15	6
	Preventing interruptions	15	5
	Giving each student the right to speak	14	12
	Using appropriate reinforcement	12	10
	Homework assignment	12	0
<i>Sum</i>		83	41

In Table 4, it is seen that pre-service teachers with high 21<sup>st</sup> century teaching skills especially in managerial skills, flexible skills, ICT skills, affirmative skills and communication skills, exhibited classroom management behaviours more frequently than pre-service teachers in the low group. In particular, it can be said that they are more effective in ensuring students' active participation in the lesson, starting the lesson by drawing attention and preventing interruptions than pre-service teachers with low 21<sup>st</sup> century teaching skills in managerial skills.

'*Dear students, how can we learn about time if there is no clock? (H4R3)*' may be given as an example of starting the lesson by drawing attention. '*... Berrak, can you switch off your voice, it echoes*'; '*Don't write on the screen.... Very good thank you (H2R4).*'; '*Let's listen to our friend. If we don't listen to someone who is talking, we would be disrespectful (H3R3).*' '*Your camera will always be on, I will see you. Press the raise hand button from the zoom when you want to tell something. Do not interrupt the lesson by calling out "teacher, teacher" Ok? (H2R4)*' are examples of preventing interruptions, demonstrating affirmative and communication skills. The last example can also be given as an example of how pre-service teachers with high 21<sup>st</sup> century teaching skills in terms of flexible skills and ICT skills employ classroom management in online settings.

'*We will start by watching a video with you first. Children, switch on your videos and let me see if you are listening or not. ... What kind of a message does he give with the saying that we did not inherit the world from our ancestors but entrusted it to our children? Write a short text about it (H2R4).*' are among the examples of practices to ensure effective participation in the lesson.



Pre-service teachers also show different approaches in terms of assigning homework. The ones with low 21<sup>st</sup> century teaching skills did not give homework at all, while those with high 21<sup>st</sup> century teaching skills assign homework in 12 of the 16 lessons. This is another example of how the higher group represents managerial skills. Some examples from the lesson records about homework are presented below.

‘Friends, I want you to practise the song this week (H2R1).’

‘I want you to think about future lighting technologies and make a design for lighting technology (H2R3).’

However, both groups were similar in exhibiting behaviours such as giving each student the right to speak and using appropriate reinforcement. For example;

‘... Hilal, Pelin, let me see who is among those who never speak. I'll choose from those who raise their fingers, okay? Aynur, you tell me (H3R4).’

‘... Elif should tell us. Let Mehmet tell us the second one. Everyone switch on their images so I can see everyone. Yes, it is a bar graph. Right, there is one more graph, let someone else tell us. Yes, frequency graph (L3R4).’

### **Assessment**

Table 5 presents the findings related to the practices in the learning teaching process.

Table 5  
*Findings Related to Assessment*

<i>Theme</i>	<i>Code</i>	<i>High (f)</i>	<i>Low (f)</i>
<i>Assessment</i>	Using traditional tools	12	2
	Evaluating the achievement of the learning outcomes	11	4
	Technology assisted	10	1
	Using alternative tools	4	1
	Non-assessment	0	8
<i>Sum</i>		37	18

As can be seen in Table 5, there are significant differences between pre-service teachers with high and low 21<sup>st</sup> century teaching skills such as managerial skills, technopedagogical skills, flexible skills and generative skills. While the pre-service teachers in the low group did not include measurement and assessment in half of the lessons analysed, the pre-service teachers with high 21<sup>st</sup> century teaching skills frequently carried out practices related to the assessment of the achievement of the learning outcomes. This may be due to the fact that pre-service teachers in the higher group have higher management skills. These pre-service teachers do not limit measurement and assessment only with question and answer or applications in which the assessment activities in the book are reflected on the screen. They also develop and apply technology-supported alternative or traditional tools. This is the result of their high level of technopedagogical skills and generative skills. This is also a result of their

flexible skills because these pre-service teachers use the online settings more effectively and adapt to teaching in these settings more quickly than the lower group. In the following examples given, *'Now let's do this fill-in-the-blank activity together. (H1R4)'*, *'What effects does force have on the event you see in the picture you see on the screen? ...Yes, don't push. (H2R2)'*, *'Let's solve this problem now, please....(H4R3)'*, it is seen that traditional measurement tools such as fill-in-the-blank, open-ended, multiple-choice questions are used. In the examples presented below, alternative assessment and evaluation tools such as project assignments and performance tasks are used.

*'I want you to make a design. What source will the lighting device we designed provide illumination and what can we say about savings and lifespan? Do this next week dear children. (H2R3)'* and *'I want you to write a story or make a picture or design a model in which you explain the formation of sound...(H4R1)'* are examples of alternative assessment activities.

In addition; *"We will continue with the word building game. We start with Ayda. Ayda, what could this word be? Well, let's continue with Ufuk, what could this word be? Yes, thank you very much. (H4R4)"* The educational game for measurement and evaluation purposes in this quotation is an example of technology-supported assessment activity. As indicated in the table and the quotations, evaluation were frequently made by pre-service teachers with high 21<sup>st</sup> century teaching skills. The ones with low 21<sup>st</sup> century teaching skills, on the other hand, rarely made assessment and evaluation to determine the achievement of the learning outcomes. They tended to monitor the learning situation only from time to time with instant questions directed to the students. Even though some pre-service teachers from this group included assessment and evaluation in their plans, they did not reflect this in the learning teaching process. For example, in L2P1, the plan for measurement and evaluation is *'Individual assessment: Why do the problems in our lives arise? How should we go about solving problems? Why is it important to learn our rights? Group assessment: Can he/she express his/her feelings and thoughts freely?'*, but assessment was not included in practice. Similarly, in L2P3, *'Individual evaluation: How to read poetry? Has anyone written a letter before? Group assessment: Can he/she express his/her feelings and thoughts comfortably?'*, but there is no assessment in the course record.

### Communication Skills

Table 6 presents the findings on how pre-service primary school teachers with low and high 21<sup>st</sup> century teaching skills display their communication skills in the learning teaching process.

Table 6  
*Findings Related to Communication*

Theme	Code	High (f)	Low (f)
Communication	Building dialogue	15	11
	Listening	15	10
	Providing instructions and/or explanations	15	10
	Paying attention to accents	15	4
	Using verbal language effectively	15	1
Sum		75	36

As indicated in Table 6, pre-service teachers with high 21<sup>st</sup> century teaching skills in terms of communication skills exhibit various communication skills quite effectively. On the other hand, pre-service teachers in the low group frequently exhibited communication skills such as dialogue, listening, giving instructions and/or explanations, but they were inadequate especially in paying attention to emphasis and using verbal language effectively. For example, in the following quotations: ‘*Good evening, boys. How are you? Are you all right? What are you doing? How nice that we see each other every week, are you happy to see us? I’m also very happy that I’ve lessons with you. Hello Elif. Sema, could you read me what we wrote, dear? (H3R3)*’ and ‘*Hello, children, how are you? How’s everything going? I’m fine, thank you. Furkan, do you have something to say? You raised your hand? Are you tired? You’ve had two lessons. (L2R1)*’ It is seen that pre-service teachers from both groups dialogue with students with similar approaches in dialogues. Similar situation is also valid for listening. When the pre-service teachers in both low and high groups exhibited this skill, they listened to the students patiently, made the students feel that they were listening with expressions such as ‘*Yes*’ and ‘*Okay*’ during the conversation, and summarised the sentences of the students to make them realise that they understood what they meant. ‘*... Melih, we are listening to you. What kind of a thing did you experience? (When the student is talking) Yes. Yes. (When the student finishes speaking) You just argued. Okay. (L4R2)*’ As in this example, both low and high group pre-service teachers effectively applied the listening skill.

However as mentioned above, pre-service teachers with high 21<sup>st</sup> century teaching skills in affirmative skills and communication skills use verbal language effectively and pay attention to emphasis. While these pre-service teachers use verbal language with a lively, emphasised tone of voice and fluent language where necessary, the pre-service teachers with low 21<sup>st</sup> century teaching skills use a more stable speech

flow and frequent interruptions by saying ‘*hmm*’. The following quotations show how the pre-service teachers in the high group use verbal language and emphasis. ‘(Using the question words in a loud and vivid voice.) *Can Yiğit read this question to us? Yiğit, can you read it again for us?* (H1R3)’ As seen in the example pre-service teacher of high group used a loud and vivid voice and repeated the question in different forms. And another example may be given as ‘(In a loud and melodic voice.) *It rains every spring, rain rain rain rain* (fast in rhythm). *The koala climbs the tree. The leaves protect him. The rabbits are running away, jumping up and down* (fast to the rhythm). *They are eating carrots in their hands* (fast in rhythm). (H2R3)’ In this example, it is seen that the pre-service teacher in the high group uses her voice effectively in terms of being rhythmic, loud and melodic. And this quotation, (with a stable unstressed voice) ‘*Well, our lesson today is social studies, you should have your textbooks with you again, we can also benefit from them. So today's lesson is the economic activities in my family and my environment. ... You can listen to the video when I switch it on. OK, OK, OK, OK, OK. Well, you hear the sound, don't you?* (L3R2)’ is an example of the pre-service teacher in the low group who used her voice stably and unstressed. In these examples, it is clearly seen that pre-service teachers with high and low group in terms of communication skill exhibit different behaviours in using verbal language and emphasising words.

### Discussion and Conclusion

As a result of the research, it was determined that both groups of pre-service teachers made clear and understandable plans and included the use of instructional technologies in their plans. However, pre-service teachers with high 21<sup>st</sup> century teaching skills in terms of managerial, technopedagogical, generative and flexible skills make more detailed plans than those with low 21<sup>st</sup> century teaching skills. These pre-service teachers explain the activities in their plans and diversify the use of strategies, methods, techniques, materials and measurement and evaluation practices. In addition, they often create their plans according to the 5E model of the constructivist approach and indicate the resources they use in their plans. However, it was determined that these issues were rarely or never included in the plans of pre-service teachers with low 21<sup>st</sup> century teacher skills. In this context, it can be said that pre-service primary school teachers with high 21<sup>st</sup> century teaching skills are more successful in planning the teaching process than pre-service teachers with low 21<sup>st</sup> century teaching skills. The ability to prepare a lesson plan includes skills such as choosing various methods, techniques and strategies suitable for the purpose, using various materials and activities, using examples from daily life and planning the teaching process (Kablan, 2012). Making plans with the mentioned qualities requires the utilisation of many 21<sup>st</sup> century teaching skills such as managerial skills, generative skills including HOT skills and technopedagogical skills with ICT literacy. Teachers who prepare qualified lesson plans are able to set achievable goals, motivate students to learn, employ a variety of participatory and innovative teaching techniques, maximize time efficiency, assess students' progress through engaging activities, and provide constructive feedback (Liakopoulou, 2011; Öztürk & Özyurt, 2020). These are also related with interpersonal communication skills, collaborative skills and affirmative skills of the 21<sup>st</sup> century teachers (Orhan Göksün & Kurt, 2017). Lesson plans designed in detail have an important value for improving the quality of the learning teaching process (Bilen, 2002;

Emidar & Indriyani, 2023; Lui & Bonner, 2016). It is also a guide for students about what they will learn and how they will be evaluated (Ramirez, 2021). In this context, the development of 21<sup>st</sup> century teaching skills of pre-service teachers in terms of is also important in terms of more effective planning of learning and teaching processes and thus increasing the quality of education. In addition, research results of the related literature shows that as seniority increases, teachers' competences related to planning the learning teaching process also increase (Doğanay & Öztürk, 2011; Fernandez & Ritchie, 1992). For this reason, it can be ensured that pre-service teachers have the skills related to planning that they can develop with seniority much earlier by developing 21<sup>st</sup> century teaching skills (Sulaiman & Ismail, 2020).

When the findings of the study related to the practices in the learning teaching process were analysed, it was found that both groups used instructional technologies and generally taught according to the plan. In this context, it can be said that the courses in teacher training programmes provide pre-service teachers with these competencies. Since techno-pedagogical content knowledge (TPACK) has a significant positive impact on the intention to integrate technology into teaching (Lai Wah & Hashim, 2021). In addition, literature review also shows that teachers and pre-service teachers have high levels of readiness to use multimedia in learning and teaching processes (Lubis et al., 2017) and their use of technology (Elçiçek, 2023). However, there are significant differences between the groups with high and low 21<sup>st</sup> century teaching skills in diversifying methods, techniques and strategies, using time efficiently, giving reinforcement, linking the learning with daily life, summarising what is learned, diversifying activities, and using various materials in teaching. These practices are related with the managerial, affirmative, generative, collaborative and HOT skills. While pre-service teachers with high 21<sup>st</sup> century teaching skills in terms of mentioned skills frequently use these practices in learning teaching processes, those with low skills use these practices occasionally or rarely. However, each of these practices contributes to the effectiveness of the learning teaching process. While linking what is learnt with daily life serves to realise transformative learning, diversification of activities, methods, techniques and strategies promote interactive learning and ultimately improve the quality of teaching. The more sensory organs are addressed in the teaching process, the more qualified the learning is (Demirel et al., 2004). The teacher's building activities addressing the objectives, student's level of readiness and diversifying these activities increase the effectiveness of teaching (Brooks & Brooks, 1999; p. 21). In addition, practices such as diversifying methods, techniques, strategies and linking the lesson with daily life also contribute to effective classroom management (Toraman & Cakmak, 2020). High quality instructional materials support and facilitate the learning process (Wulandari & Purwanto, 2017). Thus, they facilitate the teacher in achieving the objectives of the course (Rahadini et al., 2022) and respond to the needs of the students (Bykova et al., 2019; Nugraheni & Marsigit, 2021). By considering the individual differences of students, instructional materials can address their developmental needs, making teaching more enjoyable and effective (Şimşek & Yazıcı, 2021). In this context, the teaching practices of pre-service teachers with high 21<sup>st</sup> century teaching skills can be considered as an indicator that they perform a more qualified teaching.

In the study, it was also determined that pre-service teachers with high 21<sup>st</sup> century teaching skills in terms of managerial, affirmative, flexible, ICT, collaborative



and communication skills exhibited classroom management behaviours more frequently than pre-service teachers in the low group. It was determined that they were more effective than pre-service teachers with low skills especially in ensuring students' active participation in the lesson, starting the lesson by attracting attention and preventing interruptions. Also, there is a significant difference between the groups in giving homework. While pre-service teachers with low 21<sup>st</sup> century teaching skills did not give homework at all, those with high skills gave homework in 12 of the 16 lessons. As seen in the findings, the pre-service teachers as well as teachers with high 21<sup>st</sup> century teaching skills have the competence to structure learning teaching processes in a way that enables learner-centred, action oriented and transformative learning (UNESCO, 2017; UNESCO, 2020). In addition, they are equipped to use skills such as communication and collaboration effectively (Hatlevik, 2016; Omar & Ismail, 2020; Palmer, 2015; Sulaiman & Ismail, 2020; Van Laar et al., 2017). At this point, it can be said that the classroom management behaviours exhibited by pre-service teachers with high 21<sup>st</sup> century teaching skills, such as ensuring active participation in the lesson and preventing interruptions, are a product of the learner-centred, action-oriented teaching skills and communication skills they have developed. In addition, unlike the other group, it is possible to associate the fact that these pre-service teachers frequently assign homework with the transfer of learned knowledge, which is also a 21<sup>st</sup> century teaching skill defined as managerial skills. According to Okutan (2006), effective participation of all students in classroom practices, effective use of practices and behaviours such as drawing attention and reinforcement in the classroom require good management skills and knowledge. Teachers' ability to prevent interruptions, efficient use of the time allocated for teaching and ensuring students' active participation in the lesson are indicators of good classroom management (Ağaoğlu, 2008). Similar to these findings, Freitas et al., (2004) stated that experienced teachers teach their lessons in ways that attract students' attention and based on active participation. According to the constructivist approach, in order to develop various skills and meta-cognitive behaviour, only in-class activities are not enough, and homework is also needed (Güneş, 2014). In this context, giving homework by teachers plays a positive role in developing students' skills. The main factor in classroom management is the teacher's skill. For a qualified education, teachers should have developed classroom management skills in addition to their educational skills (Demirtaş, 2009). Based on the literature, it is understood that skills such as active participation, drawing attention, assigning homework and preventing interruptions are important in classroom management. All these are related with managerial skills. However, ICT skills and flexible skills are also among the skills needed to realize effective classroom management practices in online settings. Based on the findings from the research, it can be concluded that pre-service teachers with high 21<sup>st</sup> century teaching skills in terms of managerial skills, flexible skills and ICT skills are more effective in online classroom management.

In the study, significant differences were found between pre-service teachers with high and low 21<sup>st</sup> century teaching skills regarding measurement and evaluation. While pre-service teachers with high 21<sup>st</sup> century teaching skills frequently made practices related to the evaluation of the achievement of the outcomes, those in the low group rarely made evaluation; they limited the measurement and evaluation only with question and answer or applications in which the evaluation activities in the book were

reflected on smartboard. In addition to these practices, pre-service teachers with high 21<sup>st</sup> century teaching skills in terms of managerial, technopedagogical, flexible and generative skills developed and applied technology-supported alternative or traditional measurement tools inline with the objectives. 21<sup>st</sup> century teachers are expected to employ address misunderstandings directly and exploit technology to support learning behaviours in the learning teaching process (Saavedra & Opfer, 2012). In the literature, it is seen that it is important for teachers to be able to select and implement measurement and evaluation activities in a way that can support the needs of their students (Stanford & Reeves 2005; Welsh & D'Agostino 2009). However, inexperienced teachers are inadequate in giving feedback and making evaluations (Artzt & Armour-Thomas, 2001; Fernandez & Ritchie, 1992). Pre-service teachers with low 21<sup>st</sup> century teaching skills present similar characteristics in this regard. These pre-service teachers mostly did not do any measurement and evaluation to monitor the learning, and when they did measurement and evaluation, they only used traditional assessment tools and utilised the activities in the book. They did not use alternative measurement tools at all. This may be due to their low level of technopedagogical, flexible and generative skills. Because developing alternative assessment tools to be applied in online education requires the effective use of generative and technopedagogical skills, including ICT literacy skills. However, these tools have superior features compared to traditional ones in terms of ensuring that students are active out of the lesson as well as in the lesson, making a more realistic evaluation by spreading the evaluation to the process, ensuring permanence in learning and preventing rote learning, allowing students to learn by doing and encouraging them to do research (Kumru, 2021). With these features, it covers the steps that 21<sup>st</sup> century teachers are expected to apply in the learning and teaching process (Saavedra & Opfer, 2012). Although pre-service teachers with high 21<sup>st</sup> century teaching skills were inadequate in terms of professional experience, they were successful in realising the assessments of this nature. In this context, it can be said that providing pre-service teachers with 21<sup>st</sup> century teaching skills contributes to overcoming some of the limitations of professional experience.

When the findings of pre-service teachers with high and low 21<sup>st</sup> century teaching skills regarding the communication skills they used in the learning teaching process were examined, it was determined that both groups of pre-service teachers exhibited similar characteristics in behaviours such as dialogue with students, asking questions to students, listening to students and making necessary explanations, and giving instructions. However, it was determined that behaviours such as paying attention to emphasis while speaking and using verbal language effectively were exhibited more by pre-service teachers with high 21<sup>st</sup> century teaching skills. The teacher's creating a democratic learning environment in the classroom, listening to students as individuals, caring about their ideas and giving importance to communication contribute to students feeling valuable in their future lives (Gordon, 1974). Qualified teachers should be good communication experts as well as good education experts. Teachers should use their communication skills in facilitating problem solving, making democratic decisions, explanations and instructions for the teaching process (Güçlü, 1998). In addition, the teacher's asking questions that will initiate students' thinking about the subject in the educational environment increases

dialogue and interaction in the learning process (Moyles, 1987). In the teaching process, the teacher's use of verbal language shows his/her goodwill, trust, interest and listening to the student, and he/she should speak in a simple language that the student will understand. Otherwise, the student who cannot be involved in the lesson will lose interest towards the lesson (Arslantaş, 1998, p. 7). When the results obtained from the studies examining similar skills are evaluated, it is seen that one of the factors that increase the quality of the learning teaching process is communication. When the findings obtained from the research are evaluated, it can be said that both groups of pre-service teachers have high communication skills, but pre-service teachers with high 21<sup>st</sup> century teaching skills are more successful in communication skills.

In summary, when all the findings obtained from the research are analysed, it is seen that the development of pre-service teachers' 21<sup>st</sup> century teaching skills leads to results towards increasing the quality of education in all processes from planning to implementation of the learning teaching process. There are also suggestions in the literature that support the results of this study. According to Urbani et al. (2017), preservice teachers require continuous support to develop their 21<sup>st</sup> century skills, which will help them feel confident in integrating these skills into their teaching. Similarly, Voogt & Roblin (2012) suggest that teacher education programs should provide opportunities for teachers to enhance their own 21<sup>st</sup> century skills and abilities, enabling them to bring these skills into their future classrooms. In summary, high competencies in implementing teaching based on 21<sup>st</sup> century skills have empowered teachers to explore and generate more ideas, leading to more effective translation of learning outcomes (Lee, 2015; Laar et al., 2017; Sulaiman & Ismail, 2020). In light of these findings and the results of this research, it is recommended to enhance the 21<sup>st</sup> century teaching skills of preservice teachers through teacher training programs.

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The authors worked collaboratively at all stages of the article, taking equal responsibility and responsibility in the process.

### **Conflicts of Interest**

There is no conflict of interest arising from a financial, commercial, legal or professional relationship with any person, institution or organisation that may affect the research.

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