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ASSESSING TURKISH PRESERVICE ENGLISH TEACHERS' 21st CENTURY SKILLS

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Abstract

In recent years, there has been a growing recognition of the importance of 21st century skills in preparing individuals for success in the modern workforce. These skills, which include critical thinking, creativity, collaboration, communication, and digital literacy, are seen essential for individuals to navigate the complex and rapid change of global landscape. For language teachers, in particular, these skills are crucial in helping students develop the language proficiency and cultural competence necessary to communicate effectively in today's interconnected world. However, despite the recognized importance of these skills, there is limited literature on how to assess them among pre-service language teachers. To address this gap, a study was conducted to evaluate the level of 21st century skills among pre-service English language teachers in Turkish universities. The study sought to determine if there was a significant difference in the mean scores on the five latent variables of 21st century skills between two groups of pre-service teachers: group 1 consisting of freshmen and sophomores (45 students), and group 2 comprising juniors and seniors (41 students). The study utilized a survey questionnaire as the data-gathering tool and conducted a multivariate analysis of variance to analyze the data. The results of the analysis revealed a Wilks' Lambda value of .978 and a significance value of 0.674, indicating that there was no statistically significant difference between the two groups regarding their 21st century skills. Despite this lack of difference, the study highlights the importance of exposing pre-service language teachers to 21st century skills and monitoring their learning, literacy, and life skills. The study recommends that Turkish universities' pre-service language teacher education programs should incorporate these skills into their curriculum to ensure that their graduates are well-equipped to meet the demands of the modern workforce and contribute to a more globally connected and culturally competent society.

Keywords: Language teacher education, 21st century skills, Turkish pre service English teachers

1. Introduction

The rapid expansion of modern technology has presented both opportunities and challenges for the 21st century community. The educational system, like other sectors of society, has recently undergone significant changes and encountered various obstacles. It has become evident that individuals cannot perform their duties effectively without possessing special skills and abilities such as critical thinking, creativity, and collaborative skills. Our lives have become increasingly digitized (Brown, Lauder, Ashton, & Tholen, 2008), and this has impacted our work and education (Varis, 2007).

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According to Lotherington & Jenson (2011), Information and Communication Technology (ICT) has revolutionized the way we communicate and learn language literacy.

Based on recent research findings, while the significance of acquiring language skills has been highlighted (Fahas & Husaini, 2022), it has become evident that proficiency in language itself might not suffice. In the realm of education, a compelling global challenge has emerged for both educators and learners within the dynamic landscape of technology's rapid advancement and its escalating requisites in the era of information technology. At the core of this emerging challenge lies the imperative for students to cultivate a distinct array of competencies that hold pivotal importance in excelling across educational pursuits, professional realms, and personal advancement.

Despite the increasing prevalence of the term "21st century skills," there has been a noticeable lack of research into the state of teacher students' abilities in language teacher education programs. Teacher assessment criteria have been widely overlooked in the current landscape of English Language Teaching, especially regarding preservice teacher assessment. Although 21st century skills are essential for teachers, there is a dearth of literature on how to assess these skills in pre-service English Language Teachers. Furthermore, merely learning teaching methods and approaches in teacher training programs does not guarantee the skills needed for the new era.

As Rogers (2000) noted, numerous methods and approaches for second language learning emerged during the 20th century, such as Communicative Language Teaching (CLT), which emphasizes concepts such as communicative competence, learner-centeredness, and interaction. CLT paved the way for the development of new methodologies such as Content-Based Instruction (CBI) and Task-Based Instruction (TBI). However, some educators have criticized these methods, believing that they are constructed by experts and prescribed for practice. These language teaching methods have both pedagogical limitations and deceptive social, cultural, and political programs (Allright & Bailey, 1991; Stern & Allen, 1992).

Furthermore, it is imperative for educators to apply these 21st century skills in their teaching methods to enhance language education, as the current generation has a strong desire to learn through the use of technological devices and actively engage in knowledge construction (Nissim, Weissblueth, Scott-Webber, & Amar, 2016).

According to Taylor (2009), it is essential for second language learning classrooms to adopt innovative methods that integrate content, culture, technology, and lifelong learning. Similarly, Shoffner, Oliveira, and Angus (2010) emphasize the need for language classrooms to have a broader comprehension of what literacy entails. The solution to meet these demands is through the application of 21st century skills.

The purpose of this study is to assess preservice teachers' 21stcentury skills and provide an insight into the current level of assessments of the pre-service teachers on the skills of the 21stcentury. The present study aims to apply the statistical tools at disposal to create a framework for assessment of the preservice English language teachers on their skills of the 21stcentury via dividing them into two groups to diversify the sample size and reduce the chances of error.

The present study utilizes a survey-based approach to collect and extrapolate data, as teacher education is crucial in improving the skills of the 21st century. The research question at hand is whether there exists a statistically significant difference in the mean scores of the five latent variables of 21st century skills between two groups of preservice teachers: group 1 consisting of freshmen and sophomores, and group 2 comprising juniors and seniors.

Rationale

This study aims to investigate whether English teacher training programs are effective in preparing preservice language teachers with the necessary skills for the 21st century. The researcher has divided the participants into two groups, freshmen and sophomores as group 1, and juniors and seniors as group 2, as their courses are oriented towards content knowledge and pedagogical knowledge respectively. The study is motivated by the fact that language teaching approaches and methods do not fully incorporate the new 21st century skills.

Table 1. The English courses pre-service teacher-students study

	First Semester	Second Semester
Freshmen	Reading Skills 1 (2)	Reading Skills 2 (2)
	Speaking Skills 1 (2)	Speaking Skills 2 (2)
	Writing Skills 1 (2)	Writing Skills 2 (2)
	Listening Skills 1 (2)	Listening Skills 1 (2)
Sophomore	English Literature 1 (2)	English Literature 2 (2)
	Linguistics 1 (2)	Linguistics 2 (2)
	English Learning and Teaching Approaches (2)	English Teaching Programs (2)
	Critical Reading and Writing (2)	
Junior	Classroom Management (2)	Assessment and Evaluation (2)
	English Learning for Young Learners 1 (3)	English Learning for Young Learners 2 (3)
	Language and Literature Learning 1	Language and Literature 2 (2)
	English Language Teaching Skills 1 (3)	English Language Teaching Skills 2 (3)
Senior	Teaching Practice 1 (5)	Teaching Practice 1 (5)
	Materials Development (3)	English Language Assessment (3)

Theoretical Framework

The concept of "21st century skills" is broad and difficult to define precisely, as it comprises a diverse set of knowledge and skills that has not yet been officially categorized or codified. Nonetheless, this study utilizes a framework that encompasses three central 21st century skills: learning skills, literacy skills, and life skills, which are essential for English as a Foreign Language (EFL) teachers.

Table 2. 21st Century skills

Category	Component skills	Items	Total
Learning skills	Critical thinking and problem solving	1-2-3-4-5-6	21
	Creativity and innovation	7-8	
	Communication and collaboration	9-10-11-12-13	
	Curiosity and inquisitiveness	31-32-33	
	Interpersonal skills	14-15-16	
	Meta-cognition	39-40	
Literacy skills	Technology literacy	29-30-46-48-49-50	16
	Information literacy	35-47	
	Media literacy	34-45	
	Environmental literacy	36	
	Financial and business literacy	37-38	
	Visualization	44	
	Civil literacy	42-43	
Life skills	Leadership	17-18-19	13
	Entrepreneurialism	20-21	
	Health and wellness	22-23	
	Global and cultural awareness	26	
	Flexibility and adaptability	24-25	
	Accountability	41	
	Social responsibility and ethics	27-28	

2. Literature Review

According to Ledward and Hirata (2011), 21st century skills comprise a combination of content knowledge, specific skills, expertise, and literacies that are crucial for success in both work and life. They argue that these skills encompass more than just technological literacy and include proficiencies in critical thinking, problem-solving, communication, and teamwork. They further explain that these skills enable individuals to a) access, synthesize, and communicate information effectively, b) work collaboratively

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across differences to solve complex problems, and c) create new knowledge through the innovative use of multiple technologies.

21st Century Skills

The concept of 21st century skills encompass a wide range of abilities including knowledge, skills, work habits, and character traits essential for success in today's world. These include critical thinking, creativity, collaboration, communication, information literacy, media literacy, technology literacy, flexibility, leadership, initiative, productivity, and social skills. According to Bukit (2020) and Siregar (2020) social process is among the main components of learning skills. These skills can be categorized into three groups: 1) learning skills such as critical thinking, problem-solving, communication, and collaboration; 2) literacy skills including information literacy, media literacy, ICT literacy; and 3) life skills such as flexibility, adaptability, initiative, social and cross-cultural interaction, productivity, and accountability.

Learning skills

Silva (2009) emphasizes the growing significance of 21st century talents, which enable people to gather, analyze, innovate, and make decisions. According to Johnson and Reed (2008), the earliest known practitioners of such abilities were Socrates and the Sophists. Copeland (2005) highlights how Socratic circles are used in contemporary classrooms to support student-driven learning. The importance of Dewey's effect cannot be overstated; he promoted experiential learning and promoted creative problem-solving and reflective thought. According to Dewey, an educated person thinks, assesses acts, and foresees outcomes. Bloom's thinking taxonomy, which first appeared in 1956, influenced effective lesson design. Teachers now use Anderson et al.'s (2001) updated taxonomy to help integrate 21st century skills into their lessons.

The diagram depicts the four Cs - Critical thinking, Communication, Collaboration, and Creativity, which are considered essential skills for achieving proficiency in any profession. These skills play a crucial role in the growth and learning of pre-service teachers.

Literacy skills

Educators may access expert knowledge, evaluate data, build authentic environments, and encourage reflection by using technology. These chances ought to be covered in teacher preparation programs. Future educators must be tech-savvy and possess the ability to support students' development in the 21st century. Effective instruction promotes student success and calls for a range of competencies. The abilities of the twenty-first century—communication, cooperation, creativity, and critical thinking—align with multimedia-enabled learning (Kim, Raza, and Seidman, 2019; Lambert & Cuper, 2008; Prayudhsa, 2023). These include information literacy, contextual learning, and communication.

Life skills

Due to the rapid advancement of technology and information, important abilities for adaptability and competitiveness are required. Social and economic changes underscore the importance of innovation and problem-solving in the workforce. According to Darling-Hammond and Bransford (2007), the 21st century is evolving and calls for changes in education. Scott (2015) discusses digital utilization, societal adaption, and business abilities. According to Oretta (2012), schools are not equipped to meet the demands of the modern job.

Previous studies

Numerous researchers have directed their attention towards the skills required for the 21st century. Several studies have demonstrated that the skills for teaching and learning in the 21st century are expected to be well-known by teachers within the last five years (Bedir, 2019a; Ganayem & Zidan, 2018; Norahmi, 2017; Urbani, Roshandel, Michaels, & Truesdell, 2017).

Kivunja (2015a) conducted a study on the importance of 21st-century skills in the workplace, identifying the 4Cs (Critical thinking, Communication, Collaboration, and Creativity) as essential for students to thrive in the real world. In a mixed-methods research conducted by Urbani et al. (2017), it was found that integrating the development, modeling, and assessment of 21st-century skills was most effective in preparing pre-service teachers for their teaching careers. Bedir (2019a) conducted a study on the need for instruction design principles to incorporate the 4Cs (Communication, Creative thinking, Critical thinking, and Collaboration) into the classroom for pre-service English Language Teaching (ELT) education programs. Norahmi (2017) investigated students' perceptions of teachers' competence in teaching 21st-century skills, while Ganayem and Zidan (2018) studied the impact of technology education, cultural diversity, and online learning styles on students' ICT skills and teacher training, focusing on online collaborative learning and communication technology.

According to a study by Tsourapa (2018), teachers' attitudes towards developing 21st-century skills in teaching EFL were investigated. The study found that teachers who had a positive outlook and attitude were more willing to use technological devices for education in the classroom.

Albahlal (2019) examined the role of 21st century skills in English language education systems. The study found that experts have changed their approach to presenting these skills and presented strategies for integrating them into English language learning.

In Bedir's (2019b) study, ELT pre-service teachers' beliefs and perceptions regarding 21st century learning, particularly Critical, Creative thinking, Collaboration, and Communication skills (4Cs), were examined. The results showed that English teachers had a negative attitude towards the integration of 4Cs into the national curriculum, but had a positive perception about professional development for 4Cs.

Incorporating 21st century skills is a topic covered in several English language studies. Rakhmawati and Priyana (2019) discovered these abilities in high school texts to some extent. 2019's Erdoan focused on the 4Cs in EFL and provided teachers with tasks. Howlett and Zainee (2019) investigated the use of mobile devices in 21st century skills-based autonomous learning. Halverson (2018) evaluated the effect these abilities have on language instruction. Muhamad and Seng (2019) placed more emphasis on the introduction of 21st-century learning. Menggo et al. (2019) emphasized the function of academic English materials in fostering skills.

Numerous studies examine how students of English might obtain 21st century abilities. According to Motallebzadeh et al. (2018), they had an effect on speaking and writing. Task-Based Learning (TBL), according to RAO (2019), emphasizes soft skills. Saleh (2019) emphasizes the importance of critical thinking. A Problem Based Learning paradigm was proposed by Ali et al. (2018). Teachers' perceptual gaps were discovered by Tuzlukova et al. in 2018. Thai teachers showed a desire to integrate skills, according to Wattanavorakijkul (2019).

3. Method

Research Design

The present study utilized a quantitative survey design, which provides a numerical representation of the population through the examination of a sample. This research method enables researchers to answer various types of questions, including descriptive questions, questions regarding the relationships between variables, and predictive questions in longitudinal studies. The current study focused on addressing descriptive questions through the use of a survey design, as outlined by Creswell and Creswell (2017).

Research population and sampling

In this study, it is important to note that all 86 students within the program were included as part of the sample. Therefore, the sample size is equivalent to the entire population. The target population for this research encompasses all students enrolled in the ELT Department at Baskent University's Faculty of Education during the 2019-2020 academic year in Ankara, Turkey.

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Data collection instrument

To collect data, the researchers employed a questionnaire developed by Ashraf et al. (2016), which consisted of two sections. The first section contained six questions that required short answers regarding participant characteristics such as age, gender, English language proficiency level, school name, language learning experience, and level of education. The second section of the questionnaire, called the 21st Century Skill Assessment Questionnaire (CSAQ), comprised 50 items that were scored using a Likert-type scale of five points ranging from "Not at all/Never" to "Entirely/Always." The questionnaire was selected due to its inclusion of open-ended questions, which provided potential opportunities for future research. The internal consistency of the entire questionnaire was evaluated using the Cronbach Alpha reliability estimate, which yielded a reliability score of 0.82 in this study. Table 3 displays the descriptive statistics of the 21st CSAQ.

Table 3. The Descriptive Statistics of 21st CSAQ

Areas of statements	Items	Percentage
Critical thinking	1-2-3-4-5-6-31-32-33 (9)	18%
Interpersonal skills	7-8-39-40 (4)	8%
Communication	9-10-11-12-13-14-15-16-26-27-28 (11)	22%
Technology literacy	29-30-34-35-36-38-44-45-46-47-48-49-50 (13)	26%
Leadership	17-18-19-20-21-37-41-42-43 (9)	20%

Data Analysis Procedure

The study employed an online data gathering method using Google forms, which included demographic information of the participants. To ensure maximum privacy protection, the survey was conducted online, and emails were sent by the researcher to request responses from the participants. The emails contained an informal cover letter that explained the purpose of the study and informed participants of their rights. A web link was also included to make it convenient for participants to access the survey. The data collected was analyzed using SPSS, Version 22. MANOVA tests were used to analyze data for Question 1, which was collected from two groups. Group 1 comprised freshmen and sophomores, while Group 2 included juniors and seniors.

4. Results

Descriptive Statistics

Table 4. Descriptive statistics of the demographic variables of the sample

		Frequency	Percent	Valid Percent	Cumulative Percent	Total
Gender	1*	23	26.7	26.7	26.7	86
	2**	63	73.3	73.3	100.0	86
	* male ** female					
Age	1*	58	67.4	67.4	67.4	86
	2**	28	32.6	32.6	100.0	86
	* between 18-21	** 22 and more				
Experience	1*	64	74.4	74.4	74.4	86
	2**	22	25.6	25.6	100.0	86
	* yes ** no					
Group	1*	45	52.3	52.3	52.3	86
	2**	41	47.7	47.7	100.0	86

	* freshmen & sophomore		** junior & senior			
proficiency	2*	13	15.1	15.1	15.1	86
	3**	51	59.3	59.3	74.4	86
	4***	22	25.6	25.6	100.0	86
	* intermediate	** upper intermediate		*** advanced		

The table displayed above presents the demographic variables of the sample, which consisted of 86 participants. The descriptive statistics reveal that 23 respondents (26.7 %) were male, and 63 (73.3 %) were female. Due to the unequal group sizes and small number of male participants, a gender analysis was deemed inappropriate. Additionally, the data indicates that the age of 58 participants (67.4 %) ranged between 18-21 years old, while the remaining 28 participants (32.6 %) were 22 years old or older. Furthermore, 64 participants (74.4 %) reported that they had previous experience with English language learning courses, while 22 participants (25.6 %) had not attended any language courses before. The sample was nearly evenly split between freshmen and sophomores (45 students, 52.3 %) and juniors and seniors (41 students, 47.7 %). In terms of English language proficiency, 13 students (15.1 %) reported being at an intermediate level, 51 students (59.3 %) reported being at an upper-intermediate level, and 22 students (25.6 %) reported being at an advanced level. No participants reported being at a lower-intermediate level.

Table 5. Descriptive statistics of 21st century skills

	N	*Minimum*	*Maximum*	*Mean*	*Std. Deviation*	*Skewness*		*Kurtosis*	
							Std. Error		*Std. Error*
Learning Skills	79	21	66	49.60	7.69	-.747	.271	1.448	.535
Literacy Skills	79	16	55	35.48	7.53	-.320	.271	.833	.535
Life Skills	80	13	41	27.17	6.12	-.087	.269	-.384	.532
Valid N (listwise)	73								

Levene's Test

The purpose of Levene's test is to assess whether the assumption of equal variance has been violated for a given variable. This was done by examining the significance values, which needed to be less than .05 to be considered significant. In our study, none of the variables showed significant values, indicating that we can assume equal variance.

Table 6. Levene's Test of Equality of Error Variances

		Levene Statistic	df1	df2	Sig.
Learning Skills	Based on Mean	.009	1	71	.927
	Based on Median	.003	1	71	.956
	Based on Median and adjusted df	.003	1	68.760	.956
	Based on trimmed mean	.007	1	71	.932
Literacy Skills	Based on Mean	.181	1	71	.672
	Based on Median	.252	1	71	.617
	Based on Median and adjusted df	.252	1	70.727	.617
	Based on trimmed mean	.211	1	71	.648
Life Skills	Based on Mean	.010	1	71	.921

Based on Median	.008	1	71	.931
Based on Median and adjusted df	.008	1	68.765	.931
Based on trimmed mean	.006	1	71	.938

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.
a. Design: Intercept + Group

Multivariate tests

The multivariate tests of significance assess if there are significant differences among the groups on a linear combination of the dependent variables. The OF-tests for Wilks' Lambda, Hotelling's Trace, and Pillai's Trace yielded identical results (1156.915).

Table 7. Multivariate Tests [a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.981	1156.915[b]	3.000	69.000	.000	.981
	Wilks' Lambda	.019	1156.915[b]	3.000	69.000	.000	.981
	Hotelling's Trace	50.301	1156.915[b]	3.000	69.000	.000	.981
	Roy's Largest Root	50.301	1156.915[b]	3.000	69.000	.000	.981
Group	Pillai's Trace	.022	.514[b]	3.000	69.000	.674	.022
	Wilks' Lambda	.978	.514[b]	3.000	69.000	.674	.022
	Hotelling's Trace	.022	.514[b]	3.000	69.000	.674	.022
	Roy's Largest Root	.022	.514[b]	3.000	69.000	.674	.022

a. Design: Intercept + Group

b. Exact statistic

Wilks' Lambda

Based on our data analysis, the Wilks' Lambda value was .978 with a significance value of 0.674, which is not below .05. This implies that there is no statistically significant difference between group 1 and group 2 in terms of their 21st-century skills. As a result, further investigation through the analysis of the tests of between-subjects' effects and the effect size is unnecessary.

A one-way ANOVA between-groups analysis was carried out to examine whether there were variations in the levels of 21st century skills between two groups: group 1 (comprised of freshmen and sophomores) and group 2 (comprised of juniors and seniors). The dependent variables were Learning skills, Literacy skills, and Life skills, whereas the independent variable was the students' grades. Prior to conducting the analysis, preliminary assumption testing was carried out to check for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices, and multicollinearity, and no significant violations were found. The results showed no significant difference between group 1 and group 2 in terms of the combined dependent variables, with F (3, 69) = .514, p = .67, Wilks' Lambda = .98, and partial eta squared = .02.

5. Discussion

In this study, the analysis of 86 participants revealed a predominantly female sample. The age distribution ranged from 18 to 21 years for the majority of participants, with a significant proportion reporting prior experience with English language learning courses. The sample was evenly split between freshmen and sophomores and juniors and seniors. Regarding English language proficiency, a considerable

portion were at an upper-intermediate level, with no participants indicating a lower-intermediate level. The analysis of 21st-century skills showed no significant differences between Group 1 (freshmen and sophomores) and Group 2 (juniors and seniors) in terms of their 21st-century skill levels. These findings underscore the demographic characteristics of the sample and the absence of significant differences in 21st-century skills between the examined groups.

When the Digital Age began in the 21st century, technology and information quickly advanced, changing how people learn languages. Learning is impacted by both individual characteristics and the evolution of technology. Teachers are now looking for novel methods to achieve better results (Trilling & Fadel, 2009). The 21st century abilities of critical thinking and self-improvement in language acquisition were elevated throughout this period, which revolutionized academia. By utilizing indirect practice, these abilities increase proficiency and inspire learners. Effective language classrooms must be tech-savvy, which calls for teachers to develop standards and curricula that are appropriate for the Digital Age generation (Prensky, 2001).

Göksün and Kurt (2017) conducted a study on pre-service teachers' use of 21st-century skills. Their research question was similar to the current study, which aimed to investigate the utility of 21st-century skills for pre-service teachers and whether gender differences impact their ease of learning these skills. The study had 866 male and 1581 female pre-service teachers as participants, similar to the unequal sample sizes in the current study. However, the current study did not conduct a gender analysis due to the unequal group sizes, whereas Göksün and Kurt (2017) found that 21st-century teacher and learner skills use differed based on gender, university, and department.

The current research and Aslan & Zhu (2017) have similarities in the selected age group, with both studies focusing on pre-service teachers. However, the focus of the current research is on English language learning courses, while Aslan & Zhu (2017) investigated the use of ICT in teaching practices. In the current study, 74.4% of participants reported attending English language learning courses, while in Aslan & Zhu (2017), pre-service teachers reported using ICT to a moderate extent in their teaching practice.

Turkish pre-service teachers' English competency was investigated by Koçolu (2011), who discovered a relationship between self-reported proficiency and perceived efficacy. Koçolu (2011) concentrated on Turkish participants, in contrast to the current study on Venezuelan EFL teachers. Koçolu (2011) examined the self-efficacy of pre-service teachers in a manner similar to this study's analysis, noting intermediate (15.1%), upper-intermediate (59.3%), and advanced (25.6%) performance levels, but not lower intermediate. Koçolu (2011) came to the general conclusion that pre-service teachers had remarkably high perceived efficacy levels.

Moreover, Teo, Kabakçı Yurdakul, and Ursavaş (2016) conducted research that indicates a difference in digital nativity based on gender, age, and computer and technology competence. Male and young pre-service teachers scored high on the Digital Native Assessment Scale (DNAS), and no significant differences were found between these groups. However, current research on digital natives suggests that there are differences in perception between young and older users of technology. Age plays a critical role because digital natives are individuals who grew up with technology, are used to multitasking, and rely on instant gratification and rewards. Moreover, recent studies suggest that besides age, other factors, such as students' engagement with technology, experience, and breadth of technology use, also play a role.

6. Conclusion

In the present study, a MANOVA was utilized to examine if there were any variations between the mean scores of the five 21st-century skills variables. The assumptions of MANOVA, including normality, linearity, homogeneity of variance matrices, and homogeneity tests, were evaluated following the procedures outlined in Uzuntiryaki et al. (2004). The current study did not violate any of these assumptions. The Mahalanobis distance was also calculated using the regression menu to verify multivariate normality, which is a commonly used technique in cluster analysis and classification.

In the current research, the analysis indicated that one score exceeded the critical value of Mahalanobis distance, which was 16.28, but it was not significantly higher than the critical value of 13.82.

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In contrast, in a study by Cakir et al. (2015), which investigated the perceptions of pre-service and in-service teachers regarding the use of Web 2.0 in education, MANOVA was also used, and significant differences were found between the two groups' perceptions. However, in the current study, there were no violations of the assumptions.

The current research included a test of linearity, which is necessary for correlation and linear regression analysis. A linear relationship between the independent and dependent variables is ideal in a regression model. In this study, a straight-line relationship was observed between each pair of dependent variables for the groups of freshmen and sophomores and juniors and seniors, and the linearity model is presented in the results section.

In contrast to descriptive statistics that simply describe data through charts or graphs, inferential statistics allow researchers to make predictions and inferences from that data. In this study, inferential statistics were used to generalize statements about the population based on data obtained from samples. Multivariate analysis of variance was employed to explore differences in learning skills, literacy skills, and life skills among the research groups.

Box's M test is a statistical test that is utilized to examine the equality of variance-covariance matrices. It is commonly used to verify the assumption of homogeneity of variances and covariances in linear discriminant analysis and MANOVA. In the present study, Box's M test was employed to verify whether the assumption of homogeneity of variance-covariance matrices was violated. The Sig. the value of the Box's M test was found to be higher than .001, indicating that the assumption was not violated. Although Box's M test can be strict for large sample sizes, as noted by (Tabachnick et al., 2007), the Sig. the value of Box's M in this study was .81, suggesting that the assumption was not violated.

The current research utilized Levene's test to determine whether multiple samples have equal variances, which is also known as homogeneity of variance. The assumption of equal variances across samples is necessary for the analysis of variance. In this study, the researcher used Levene's test to check whether the assumption of equal variance was violated. The Sig. values for all variables were not significant (less than .05), indicating that equal variance was observed.

Multivariate tests of significance were used to identify statistically significant differences between the groups on a linear combination of dependent variables. The OF-tests for Wilks' Lambda, Hotelling's Trace, and Pillai's Trace were all identical, yielding a value of 1156.915.

The Wilk's Lambda value of 0.978 and a significant value of 0.674 obtained in the analysis of the current research show that there was no significant difference between group 1 and group 2 when evaluating their 21st-century skills. Wilk's Lambda assesses the differences between two or more groups for multiple variables simultaneously. Thus, the study did not find any statistically significant differences in 21st-century skills between the two groups.

The research conducted by Saltan & Arslan (2017) is comparable to the present study as it examines the self-confidence of pre-service and in-service teachers in utilizing technology in their teaching practice. However, Saltan & Arslan's study has a larger sample size, consisting of 388 pre-service and 211 in-service teachers from various subject areas, while the current study focuses solely on English teachers. Both studies utilized statistical tools such as Sample T-test and MANOVA.

Another study by Uzuntiryaki, Bilgin, and Geban (2004) also employed MANOVA to investigate the differences between male and female pre-service teachers in terms of learning style preferences and technology adoption. However, the present study examined the differences between groups of students based on their grade level, with learning skills, literacy skills, and life skills as dependent variables. While Uzuntiryaki et al. (2004) found no significant gender difference in learning styles, the current study did not analyze gender differences due to uneven sample sizes.

Öz (2015) conducted a study to assess the technological and pedagogical content knowledge of EFL pre-service teachers using the Technological Pedagogical Content Knowledge Scale (TPACK). Unlike the current study, Öz's findings indicated significant gender differences in technological and pedagogical knowledge, and the data was collected through qualitative methods.

Kurt, Mishra and Kocoglu (2013) explored the development of Technological Pedagogical Content Knowledge (TPACK) among Turkish pre-service English teachers. The study aimed to address the importance of technological skills in language teaching. The sample size was smaller than the current study, with no analysis based on gender differences. The study involved a 12-week course to develop pre-service teachers' TPACK, which is not part of the current study's quantitative methodology.

Kömür (2010) examined the relationship between pre-service English teachers' content knowledge, perceived efficacy, and practical experience. While the study's scope is similar to the current research, Kömür (2010) assessed pre-service teachers' real classroom experiences, which is not included in the current study. Kömür (2010) used both quantitative and qualitative data analysis, while the current study relied only on quantitative methods.

Digital literacy's importance for Turkish pre-service teacher preparation was highlighted by Üstünda et al. (2017). These concerns about 21st-century skills in education are echoed in the current study. This study is unique in that it only included pre-service English teachers and did not include student perception. A digital literacy scale created by Ng'ethe et al. (2012) is not present here. Additionally, Üstünda et al. (2017) includes science pre-service teachers with a bigger sample, but this study only examines English pre-service teachers.

Koçoğlu (2011) investigated emotional intelligence and teacher efficacy among 90 pre-service English teachers in Turkey. While the sample size and professional achievement of the teachers are similar to the current study, the variables studied do not align with the current research's scope. The current study considered pre-service teachers' demographics and divided them into two groups to answer research questions.

In their study, Kartal & Afacan (2017) conducted research on 591 pre-service teachers from a rural city in Turkey. In comparison, the current research had a smaller sample size of only 86 respondents. The decision to use a small sample size was made to avoid violating the assumption of Box's M with a large sample size. Demographic variables such as gender, age, and grade were similar between the two studies.

Similarly, Bedir (2019b) also studied pre-service English language teachers, but their research focused on participants' perceptions of 21st-century learning skills, particularly in relation to technology integration in classroom teaching. In contrast, the current research did not consider teachers' perceptions of 21st-century skills as defining features through a questionnaire or survey.

This study has some limitations that need to be taken into consideration. Firstly, it is important to note that the research was conducted with a limited sample size of 137 preservice EFL teachers. Additionally, the study used two different Likert-type questionnaires with limited answer choices, which may have restricted the range of responses provided by participants. Despite these limitations, the study yielded some important pedagogical implications. Specifically, it highlights the need for English teachers to prioritize their own 21st century skills, as pre-service programs may not adequately equip them with these skills. Curriculum and course planners in the field of English language teacher training should therefore review and assess the extent to which their courses address these skills.

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