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Research Article ♪ Araştırma Makalesi

An investigation of art education students' perceptions of 21st-century skills competence and critical thinking tendencies

Sanat eğitimi öğrencilerinin 21. yüzyıl becerileri yetkinliklerine ve eleştirel düşünme eğilimlerine ilişkin algılarının incelenmesi

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ABSTRACT

The purpose of this study is to examine art education students' perceptions of 21st-century skills competence and their critical thinking tendencies, to reveal the relationship between these two variables, and to analyze this relationship in terms of department, gender, and grade level. The study was conducted using a quantitative survey model with a total of 165 students, including 77 students from the music department of the Neşet Ertaş Faculty of Fine Arts at Kırşehir Ahi Evran University and 88 students from the Department of Art Education at the Faculty of Education at Ege University in İzmir during the spring semester of the 2024–2025 academic year.

The findings indicate that students generally "mostly agree" with the items of both the 21st-century skills Competence Perception Scale and the Critical Thinking Tendencies Scale, suggesting high levels of perceived competence and positive critical thinking tendencies. Students' perceptions of 21st-century skills competence showed statistically significant differences according to department and grade level, whereas no significant difference was found based on gender. Similarly, no statistically significant difference was found in the overall critical thinking tendencies according to the department variable.

A key finding of the study is the strong and positive relationship between 21st-century skills competence perceptions and critical thinking tendencies ($r = .707$, $p < .01$). This result indicates that higher levels of perceived 21st-century skills competence are associated with stronger critical thinking tendencies.

Based on these findings, it is recommended that art education programs incorporate instructional practices that simultaneously support the development of 21st-century skills and critical thinking. In particular, student-centered learning environments, interdisciplinary approaches, and activities that promote creativity and problem-solving may enhance both competencies effectively.

Keywords: 21st-century skills, critical thinking skills, art education, art education students

ÖZ

Bu çalışmanın amacı, sanat eğitimi alan öğrencilerin 21. yüzyıl becerileri yetkinliklerine yönelik algıları ile eleştirel düşünme eğilimlerini incelemek, bu iki değişken arasındaki ilişkiyi ortaya koymak ve söz konusu ilişkiyi bölüm, cinsiyet ve sınıf düzeyi değişkenleri açısından analiz etmektir. Araştırma, 2024–2025 eğitim-öğretim yılı bahar döneminde Kırşehir Ahi Evran Üniversitesi Neşet Ertaş Güzel Sanatlar Fakültesi Müzik Bölümü'nde öğrenim gören 77 öğrenci ile İzmir Ege Üniversitesi Eğitim Fakültesi Resim Eğitimi Bölümü'nde öğrenim gören 88 öğrenci olmak üzere toplam 165 öğrenci üzerinde nicel araştırma yöntemlerinden tarama modeli kullanılarak gerçekleştirilmiştir.

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Araştırma bulguları, öğrencilerin hem 21. Yüzyıl Becerileri Yetkinlik Algı Ölçeği hem de Eleştirel Düşünme Eğilimleri Ölçeği maddelerine genel olarak "çoğunlukla katıldıklarını" ve bu durumun yüksek düzeyde yetkinlik algısı ile olumlu eleştirel düşünme eğilimlerine işaret ettiğini göstermektedir. Öğrencilerin 21. yüzyıl becerileri yetkinlik algılarının bölüm ve sınıf düzeyine göre istatistiksel olarak anlamlı farklılık gösterdiği, ancak cinsiyet değişkenine göre anlamlı bir farklılık göstermediği belirlenmiştir. Benzer şekilde, eleştirel düşünme eğilimlerinin genelinde bölüm değişkenine göre istatistiksel olarak anlamlı bir farklılık tespit edilmemiştir.

Araştırmanın en önemli bulgularından biri, 21. yüzyıl becerileri yetkinlik algıları ile eleştirel düşünme eğilimleri arasında güçlü ve pozitif yönlü bir ilişkinin bulunmasıdır ($r = .707$, $p < .01$). Bu bulgu, öğrencilerin 21. yüzyıl becerilerine yönelik algıları arttıkça eleştirel düşünme eğilimlerinin de arttığını göstermektedir.

Bu bulgular doğrultusunda, sanat eğitimi programlarında 21. yüzyıl becerileri ile eleştirel düşünme becerilerini eş zamanlı olarak geliştirmeye yönelik öğretim uygulamalarına yer verilmesi önerilmektedir. Özellikle öğrenci merkezli öğrenme ortamlarının oluşturulması, disiplinlerarası yaklaşımların benimsenmesi ve yaratıcılığı ile problem çözme becerilerini destekleyen etkinliklerin uygulanması, her iki becerinin daha etkili ve sürdürülebilir biçimde geliştirilmesine katkı sağlayabilir.

Anahtar kelimeler: sanat eğitimi, 21. yy becerileri, eleştirel düşünme, eleştirel düşünme becerileri, öğrenci algıları

1. INTRODUCTION

The competitive and knowledge-based structure of the global economy, combined with rapid developments in information and communication technologies, requires both individuals and education systems to adapt quickly. It is crucial for students to acquire "survival skills," referred to as 21st-century skills, to prepare for the professions of the future. This will enable them to protect themselves from falling behind and becoming disadvantaged, both in their own countries and globally. However, schools often struggle to keep pace with this rapid change and fail to develop at the same speed (Wagner, 2008). There is no specific definition or content for 21st-century skills, also known as "survival skills," which are becoming increasingly important today. These skills are defined in various ways by different institutions (Dede, 2010; Sayın & Seferoğlu, 2016; Wagner, 2008). Budsankom et al. (2015) divide thinking skills into three types. These are analytical, critical, and creative thinking. Analytical thinking is the process of breaking down information into parts for better observation and explanation; critical thinking is discovering different dimensions of information; creative thinking is an innovation initiative that reorganizes and relates information in an innovative way.

The world we live in is rapidly changing; these changes bring with them many innovations and developments. Throughout history, the expectations of people and their needs have differed from century to century. However, today, individuals' interests and needs are changing much more rapidly than in the past (Tiryakioğlu, 2022).

Anagün et al. emphasize the importance of teachers and students possessing certain competencies because of the rapid changes in our era. These competencies are not limited to the capacity to adapt to or respond to sudden changes, but also include fundamental skills such as keeping up with technological developments, selecting and analyzing relevant information

from the rapidly growing mass of knowledge and transforming acquired knowledge into concrete outputs by integrating it into daily life. In this context, these skills and competencies required by the information society are referred to as 21st-century skills (Anagün et al., 2016). The current century expects individuals to have high communication skills, openness to cooperation, and the ability to identify problems and generate solutions. The rapid advancement of technology and science affects people in all areas of life. In this context, contemporary education systems need to cultivate individuals who are equipped with the necessary skills, easily adapt to changing technology, are productive, inquisitive, and open to learning (Tiryakioğlu, 2022). In today's world, there are two main generations: digital natives and digital immigrants. Individuals who were born and raised in the 21st century, whose daily lives revolve around technology and who conduct all their business using technology, are defined as digital natives. On the other hand, generations that are trying to adapt to the development of technology and adjust to digital environments constitute digital immigrants (Bilgiç Doğan et al., 2011). Countries that update their education systems in line with the requirements of the 21st century can maintain their position in the global economy and rise to higher ranks (Çiftçi & Bakar, 2020). The skills acquired in formal education play a critical role in preparing students for their future lives and careers (Eryılmaz, 2018).

For students preparing for increasingly complex living and working environments in the 21st century, interest in learning and innovation skills is growing. Critical and creative thinking, communication, and collaboration are emerging as very important skills for preparing students for the future (Kozikoğlu, 2019).

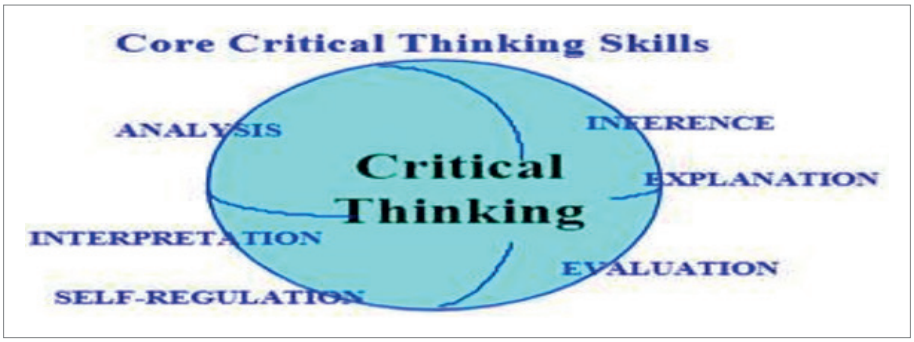
Since today's children will be the parents of the future, it is particularly important to raise them as conscious individuals in areas such as new media tools and 21st-century skills, especially in this era of easy access to the internet and technology. The relationship between the 21st-century self-efficacy perceptions of students receiving arts education and their critical thinking tendencies plays an important role in shaping the competencies expected of individuals in our era. In this context, critical thinking and effective decision-making are fundamental cognitive skills that an educated individual should possess (National Commission on Excellence in Education [NCEE], 1983). The word "critical" originates from the Greek term "kritikos," which carries the meanings of evaluation, judgment, and discernment. This word, which became "criticus" in Latin, spread from there to other languages. Criticism is generally defined as the act of evaluating both the positive and negative aspects of something (Kaya, 1997). According to Epstein (1999), critical thinking is a defense mechanism for individuals in today's world, which is characterized by an intense flow of information and persuasion efforts. This ability saves people from floundering in the face of unverified claims and ideas. Furthermore, critical thinking acts as a fundamental engine that triggers knowledge production. In democratic societies, it is crucial that individuals use their critical thinking and decision-making skills to solve complex social problems. Educational philosophers also view critical thinking not as an option in the teaching process, but as an integral part of education (Norris, 1985, as cited in Akbıyık & Seferoğlu, 2002). There are different definitions of critical thinking. Ennis (1985) approaches critical thinking through three basic structures: judgment, development of knowledge, and questioning. According to him, critical thinking is a reflective and logical form of thinking that focuses on deciding what to do and what to believe.

Various definitions of critical thinking exist. Smith defines critical thinking as a judgment process focused on accepting or rejecting claims, while Paul approaches this concept as processes of shaping and evaluating one's own thoughts. According to Mayhew, critical thinking is the process of questioning the "how" and "why" of a subject (Branch, 2000). In order to establish an interdisciplinary definition of critical thinking, the American Psychological Association (APA) conducted a study in 1990 with the participation of 46 theorists from the United States and Canada. As a result of this study, critical thinking was defined as "making analytical, evaluative, conscious judgments and expressing these judgments in order to decide what to do and what to believe" (Evancho, 2000).

According to Facione (2000), critical thinking consists of six interrelated cognitive skills: interpretation, analysis, inference, evaluation, explanation, and self-regulation. The Figure 1 represents how these skills operate together as an integrated process. While interpretation, analysis and self-regulation involve understanding and monitoring one's thinking, inference, explanation and evaluation focus on drawing and justifying reasoned judgments. At the center, critical thinking reflects the coordinated use of all six skills.

Figure 1

Critical thinking (adapted from Facione, 2000)



Critical thinking skills for fine arts students not only enable them to gain technical proficiency but also deepen their creative thinking and question their artistic production. In this way, they develop their own art more consciously and can better understand their place in the art world. A critical perspective also contributes significantly to their intellectual and conceptual maturation. Advances in science and technology are transforming the competencies expected of individuals. Therefore, the ability to access and manage

information, critical thinking, questioning and evaluation capacity, and the ability to understand and adapt to change and developments are becoming increasingly important (Ayaz, 2015; Kurbanoğlu & Akkoyunlu, 2001). Richmond (2009) argues that art education helps students "liberate themselves" by enabling them to "have a more independent vision and for this vision to be the basis of personal action and subsequently shape one's own life."

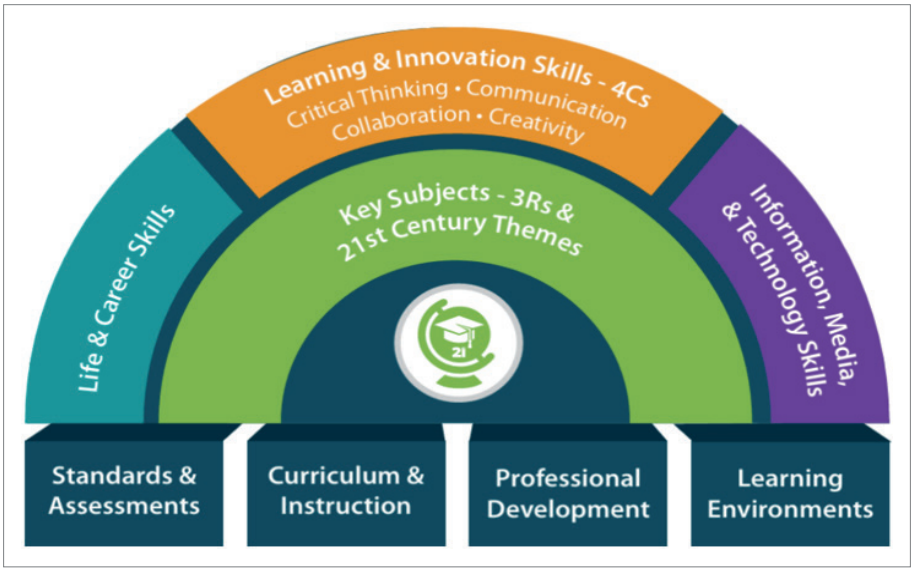
Critical thinking enables fine arts students to question and interpret their own work more deeply. In this way, they gain the ability to evaluate a work not only in terms of its aesthetic aspects, but also in terms of its conceptual, social, and cultural contexts. While questioning why they do what they do, students discover different perspectives and can imbue their work with more layered meanings. For example, being able to look at a painting not only in terms of its colors and composition, but also in terms of the social message or personal expression it conveys, is an important indicator of critical thinking. In today's educational approach, it is particularly important to enable students to discover themselves and equip them with 21st- century learning skills (Küçükoğlu, 2018; Tasgin & Dilek, 2023). 21st-century education aims to provide students with gains in areas of competence such as problem solving and critical thinking. It is essential to raise individuals in society as productive and self-actualized individuals based on their personal differences and richness (Hotaman, 2019; Saxena, 2013).

The 21st-century skills framework delineates the essential competencies that enable individuals to succeed in contemporary work and life contexts. As illustrated in the Figure 2, these skills are categorized into four main groups: life and career skills, learning and innovation skills, core academic subjects and 21st-century themes, and information, media, and technology skills (Partnership for 21st Century Learning, 2019). Notably, within the life and career skills category, behavioral competencies such as flexibility, self-management, and social skills are emphasized. Similarly, the OECD's Learning Compass 2030 report underscores the importance of education systems focusing on fostering these skills to support individuals' adaptability to rapidly changing environments, highlighting the development of social and emotional skills (OECD, 2018).

Integrating these skills into education requires a comprehensive approach that extends beyond curriculum and instruction to include standards and assessments, professional development for educators, and the restructuring of learning environments. This holistic approach aims to equip learners with the competencies necessary for the 21st century and is critical for the effectiveness of education policies (Saavedra & Opfer, 2012; Trilling & Fadel, 2009). Consequently, 21st-century skills emphasize multidimensional capabilities such as critical thinking, problem-solving, collaboration, and digital literacy, moving beyond mere knowledge transmission.

Figure 2

The Partnership for 21st Century Learning (2019)



In this context, art education is an important learning discipline that goes beyond developing individuals' creative expression skills. It reinforces the perception of self-efficacy, which is among the competencies of

the 21st century, and positively influences students' critical thinking tendencies. A review of the literature reveals that studies on 21st-century self-efficacy perceptions and critical thinking tendencies have been conducted separately, but no studies have been found in the field of art education that address both 21st-century self-efficacy perceptions and critical thinking tendencies. Therefore, this study is of particular importance and is expected to contribute a different dimension to the literature.

1.1. Purpose and Significance

The purpose of the study is to examine art education students' perceptions of 21st-century skills competencies and critical thinking tendencies, to reveal the relationship between 21st- century skills and critical thinking tendencies, and to examine this relationship in terms of department, gender, and class variables.

This research is important because it examines the perception of 21st-century skills and critical thinking tendencies among students in art education, reveals the relationship between them, and is the first study to examine and analyze both 21st-century skills and critical thinking tendencies among students in art education. The research results are expected to contribute to identifying the current needs of students in different departments of art education.

For individuals to adapt to change and assimilate technological innovations, analyze and evaluate the necessary information from the ongoing accumulation of knowledge and transform it into a product that can be used in their daily lives, and efficiently maintain their personal, social, and professional lives, they must possess a set of high-level competencies. These skills, which enable individuals to analyze events from different perspectives, cope with problems, and thus continue their lives successfully and competently, are referred to as 21st- century skills (Anagün et al., 2016).

Technological developments in art education are important in terms of developing new learning-teaching approaches, methods, and techniques, improving the quality of art education, and meeting the needs and expectations of the day. It is particularly important and necessary to follow these developments in all dimensions of education and apply them to teaching processes. Following these developments requires that individuals in the field of art education have acquired critical thinking skills so that they can research, question, and evaluate them.

Based on these considerations, the research aims to investigate the relationship between the 21st-century skills competency perceptions and critical thinking tendencies of students in music and art education, as well as to determine their 21st-century competency perceptions and critical thinking tendencies according to demographic characteristics. The following sub-problems have been identified in line with this objective.

For students in art education:

1. What are their perceptions of 21st-century skills proficiency?

1.1. Do perceptions of 21st-century skills competence differ according to the department variable?

1.2. Do competency perceptions regarding 21st-century skills differ according to grade level?

1.3. Do perceptions of 21st-century skills competence differ according to the gender variable?

2. What are their critical thinking tendencies?

2.1. Do critical thinking tendencies differ according to the department variable?

2.2. Do students' critical thinking tendencies differ according to grade level?

2.3. Do critical thinking tendencies differ according to the gender variable?

3. Is there a relationship between 21st-century skills competency perceptions and critical thinking tendencies?

2. METHOD

2.1. Research Model

The survey model, one of the quantitative methods, was used in the research. The survey model enables the quantitative or numerical description of trends, attitudes, and opinions in the general population through studies conducted on a sample selected from that population (Creswell, 2017). A correlational survey model was used to determine the relationship between the perception of 21st-century skills competence and critical thinking tendencies, which was one of the sub- problems of the study.

The correlational survey model is a research model that aims to determine the existence or degree of co-variation between two or more variables (Karasar, 2005).

2.2. Research Groups

The sample of the study consists of a total of 165 undergraduate students who voluntarily participated in the research during the spring semester of the 2024/2025 academic year. Of these, 77 students are enrolled in the Department of Music at the Neşet Ertaş Faculty of Fine Arts at Kırşehir Ahi Evran University, and 88 students are enrolled in the Department of Painting Education at the Faculty of Education at İzmir Ege University. The inclusion of participants from different universities in the research group is primarily aimed at ensuring the representation of various disciplines within the field of art education. At Kırşehir Ahi Evran University, where the researcher is affiliated, there is only an undergraduate program in the Department of Music within the Faculty of Fine Arts, and no undergraduate program in art (painting) education is available. Therefore, in order to include different disciplines of art education, participants in the field of painting education were selected from the Department of Art Education at the Faculty of Education at İzmir Ege University.

In this context, the sampling procedure is not random; rather, it is based on criterion sampling, one of the purposive sampling methods. Criterion sampling enables the inclusion of individuals who meet specific characteristics, thereby ensuring that the data collected are aligned with the purpose of the study (Yıldırım & Şimşek, 2018). The criteria for selecting the participants included: (i) being enrolled in an undergraduate program in art education, (ii) representing different disciplines (music and painting education), and (iii) voluntary participation in the study.

Furthermore, including participants from different universities prevents the findings from being limited to a single institutional context and contributes to enhancing the external validity (generalizability) of the study. The use of diverse sample groups allows the results to be generalized to a broader population (Creswell, 2014). In addition, the use of the same measurement instruments and the implementation of data collection procedures under similar conditions ensured the objectivity and comparability of the findings across groups (Büyüköztürk, 2018).

Table 1

Demographic characteristics of the students comprising the research group

		N	%
Gender	Female	104	63
	Male	61	37
University and Department	Kırşehir Ahi Evran Music	77	46.6
	Ege University Painting	88	53.3
Grade	1st Grade	42	25.4
	2nd Grade	41	24.8
	3rd Grade	45	27.2
	4th Grade	37	22.4

Table 1 presents the demographic characteristics of the students comprising the research group. According to the findings, the majority of the participants are female (n = 104, 63%), while male students constitute 37% of the sample (n = 61). This indicates that female students are more represented in the study group.

In terms of university and department distribution, 46.6% of the participants (n = 77) are students from the Department of Music at Kırşehir Ahi Evran University, whereas 53.3% (n = 88) are students from the Department of Painting Education at Ege University. This distribution shows that the sample includes participants from both institutions in relatively balanced proportions.

Regarding grade levels, the distribution is fairly homogeneous. The highest proportion belongs to third-year students (n = 45, 27.2%), followed by first-year students (n = 42, 25.4%), second-year students (n = 41, 24.8%), and fourth-year students (n = 37, 22.4%). These results suggest that participants from all grade levels are included in the study in a relatively balanced manner.

Overall, the demographic distribution of the sample indicates a diverse and balanced representation in terms of gender, institutional affiliation, and grade level, which contributes to the reliability and generalizability of the study findings.

Table 2

Gender and grade level distribution of students in the research group

Department	Gender	1st Grade	2nd Grade	3rd Grade	4th Grade	Total
Music	Female	13	11	16	10	50
	Male	7	8	7	5	27
	Total	20	19	23	15	77
Painting	Female	17	12	12	13	54
	Male	5	10	10	9	34
	Total	22	22	22	22	88
General Total		42	41	45	37	165

Table 2 presents the distribution of students in the research group according to gender and grade level across departments.

In the Department of Music, female students constitute the majority in all grade levels. Specifically, there are 13 female and 7 male students in the 1st grade, 11 female and 8 male students in the 2nd grade, 16 female and 7 male students in the 3rd grade, and 10 female and 5 male students in the 4th grade. In total, 50 of the 77 students are female, while 27 are male, indicating a higher representation of female students in the music department.

Similarly, in the Department of Painting, female students are also more prevalent than male students across all grade levels. The distribution shows 17 female and 5 male students in the 1st grade, 12 female and 10 male students in the 2nd grade, 12 female and 10 male students in the 3rd grade, and 13 female and 9 male students in the 4th grade. Overall, 54 of the 88 students are female, while 34 are male.

When the overall distribution is considered, the number of students across grade levels appears to be relatively balanced, with 42 students in the 1st grade, 41 in the 2nd grade, 45 in the 3rd grade, and 37 in the 4th grade, totaling 165 participants.

Overall, the findings indicate that female students are more represented than male students in both departments and across all grade levels. Additionally, the relatively balanced distribution of students across grade levels supports the comparability of the groups and contributes to the robustness of the study

2.3. MEASUREMENT TOOLS

2.3.1. Critical Thinking Tendencies Scale (CTTS)

The Critical Thinking Tendencies Scale (CTTS) developed by Semerci (2016). The scale is multidimensional, with sub-themes of metacognition, flexibility, systematicity, perseverance-patience, and open-mindedness. The scale consists of 49 items. The scale is rated as follows: "Strongly agree (5), mostly agree (4), partially agree (3), mostly disagree (2), strongly disagree (1)". The evaluation scale used in interpreting the calculated average values was created using the formula Range = (Range Width) / (Number of Groups) (Arseven, 1993; Taşdemir, 2003; Turgut, 1992). Accordingly, the evaluation scale is provided in Table 3.

The test-retest correlation of the scale was found to be 0.761, and the correlation coefficient between the two halves was 0.95. As a result of the reliability analysis conducted by the researchers, the Cronbach alpha coefficient of the CTTS was found 0.929.

Table 3

Score thresholds determining students' levels of agreement with statements

Weight Assigned	Score Ranges	Threshold
5	4.201-5.000	I completely agree
4	3,401-4,200	Mostly agree
3	2,601-3,400	I partially agree
2	1,801-2,600	Mostly disagree
1	1,000-1,800	I strongly disagree

2.3.2. 21st-Century Skills Competency Perception Scale (21stCSCPS)

The 21st-century skills Competency Perceptions Scale (21stCSCPS) was developed by Anagün et al. (2016). As a result of the exploratory factor analysis, 42 items were retained in the scale, and these items were grouped under three factors: learning and innovation skills, life and career skills, and information, media, and technology skills. The scale consists of 42 items, and this three-factor structure was found to be both theoretically and statistically appropriate. The validity and reliability analyses conducted by Anagün et al. (2016) demonstrated that the scale has sufficient psychometric properties for use with teacher candidates.

The evaluation criteria used in interpreting the mean scores were determined based on the formula *Range = (Range Width) / (Number of Groups)* (Arseven, 1993; Taşdemir, 2003; Turgut, 1992). Accordingly, the evaluation intervals are presented in Table 4.

Regarding reliability, the Cronbach's alpha coefficient reported in the original study was .889. In the present study, the Cronbach's alpha coefficient for the 21stCSCPS was found to be .899, indicating a high level of internal consistency.

Table 4

Score thresholds determining students' levels of agreement with statements

Weight Assigned	Score Ranges	Threshold
5	4.201-5.000	I completely agree
4	3.401-4.200	Mostly agree
3	2.601-3.400	I partially agree
2	1.801-2.600	Mostly disagree
1	1.000-1.800	I strongly disagree

2.4. Data analysis

After the data was collected, it was transferred to the SPSS software package and checked for normal distribution before analysis. Table 5 shows the results of the normal distribution analysis for both scales.

Table 5

Normality analysis results of measurement tools

Data Collection Tool	N	x̄	Kolmogorov-Smirnov p	Skewness	Kurtosis
21st-Century Skills Competency Perception Scale (21stCSCPS)	165	3.85	0.750	0.204	-0.504
The Critical Thinking Tendencies Scale (CTTS)	165	3.86	0.540	0.004	-0.585

When examining the results of the normality analysis for the 21st-century skills Competency Perceptions Scale, the skewness value was 0.204 and the kurtosis value was −0.504. The Kolmogorov–Smirnov test result was not statistically significant *(p = .750)*. Since the skewness and kurtosis values fall within the acceptable range of −1.50 to +1.50 (Tabachnick & Fidell, 2013), and the p-value is greater than .05, the data can be considered to follow a normal distribution (Büyüköztürk, 2022).

Similarly, for the Critical Thinking Tendencies Scale, the skewness value was 0.004 and the kurtosis value was −0.585. The Kolmogorov–Smirnov test result was not statistically significant *(p = .540)*. As the skewness and kurtosis values fall within the acceptable range of −1.50 to +1.50 (Tabachnick & Fidell, 2013), and the p-value is greater than .05, the data can be considered to follow a normal distribution (Büyüköztürk, 2022).

3. FINDINGS

The reliability analysis results for the entire Critical Thinking Tendency Scale and its sub-factors conducted by the researchers are presented in Table 6.

Table 6

Reliability analysis results for the critical thinking tendency scale and its sub-factors

Sub-factors/Scale	Number of Items	Cronbach's Alpha
Metacognition	14	.795
Flexibility	11	.785
Systematicity	13	.804
Determination and Patience	8	.769
Open-mindedness	3	.786
Critical Thinking Tendency Scale	49	.929

Table 6 presents the reliability analysis results of the Critical Thinking Tendencies Scale and its sub-factors. The internal consistency of the scale was examined using Cronbach's alpha coefficients.

According to the findings, the overall reliability coefficient of the scale is quite high (α = .929), indicating excellent internal consistency. This result suggests that the scale is a highly reliable measurement tool.

When the sub-factors are examined, the Cronbach's alpha values are as follows: metacognition (α = .795), flexibility (α = .785), systematicity (α = .804), determination and patience (α = .769), and open-mindedness (α = .786). All sub-dimensions have reliability coefficients above .70, indicating acceptable to good levels of internal consistency.

Among the sub-factors, systematicity has the highest reliability coefficient (α = .804), while determination and patience has the lowest (α = .769). However, even the lowest value exceeds the acceptable threshold, indicating that all sub-dimensions are sufficiently reliable.

Overall, these findings demonstrate that both the overall scale and its sub-dimensions provide consistent and reliable measurements, supporting their use in this study. In line with the literature, reliability coefficients above .70 indicate that a scale is considered reliable (Kayış, 2008).

The reliability analysis results for the entire 21st-Century Skills Competency Perceptions Scale and its sub-factors conducted by the researchers are presented in Table 7.

Table 7

Reliability analysis results for the 21st-Century Skills competency perceptions scale and its Sub-factors

Sub-factors	Number of Items	Cronbach's Alpha
Learning and Renewal Skills	16	.810
Life and Career Skills	18	.792
Knowledge, Media and Technology Skills	8	.732
21st Century Skills Competency Perceptions Scale	42	.899

Table 7 presents the reliability analysis results of the 21st-century skills Competency Perceptions Scale and its sub-factors. The internal consistency of the scale was examined using Cronbach's alpha coefficients.

According to the findings, the overall Cronbach's alpha coefficient of the scale is high (α = .899), indicating strong internal consistency and a high level of reliability.

When the sub-factors are examined, the Cronbach's alpha values are as follows: learning and innovation skills (α = .810), life and career skills (α = .792), and information, media, and technology skills (α = .732). Since all sub-dimensions have reliability coefficients above .70, they can be considered to have acceptable to good levels of reliability (Kayış, 2008).

Among the sub-factors, the highest reliability coefficient belongs to the learning and innovation skills dimension (α = .810), while the lowest is observed in the information, media, and technology skills dimension (α = .732). However, all values fall within acceptable limits.

Overall, these findings indicate that both the overall scale and its sub-dimensions provide consistent and reliable measurements, supporting the appropriateness of using this scale in the present study.

3.1. Perceptions of 21st-Century Skills competence among students in art education

The descriptive analysis results for the overall 21st-Century Skills Competency Perception Scale for art education students are presented in Table 8.

Table 8

Descriptive statistical results for the 21st-Century Skills competency perception scale and its sub-factors

Sub-factors	$\bar{x}$	SD	Level
Learning and Renewal Skills	3.78	.54	Mostly Agree
Life and Career Skills	3.86	.52	Mostly Agree
Knowledge, Media and Technology Skills	3.96	.62	Mostly Agree
Overall Scale	3.85	.48	Mostly Agree

Table 8 shows that students receiving art education demonstrate overall 21st-century skills competency perceptions at the "mostly agree" level (M = 3.85, SD = .48).

Similarly, students reported "mostly agree" levels in all sub-dimensions, including learning and innovation skills (M = 3.78, SD = .54), life and career skills (M = 3.86, SD = .52), and information, media, and technology skills (M = 3.96, SD = .62).

In contrast, Herlinawati et al. (2024) found that teacher candidates do not yet possess 21st-century skills at the desired level.

3.1.1. Do art education students' perceptions of 21st century skills competence differ according to department variables?

The t-test results for students' perceptions of 21st-Century Skills competence and sub-factors are shown in Table 9.

Table 9

T-test results for 21st-Century Skills competency perceptions and sub-factors

Sub-factors	Department	N	M	SD	t	p	η^2
Learning and Innovation Skills	Music	77	3.88	.53	2.401	.017*	.030
	Painting	88	3.68	.54			
Life and Career Skills	Music	77	4.06	.45	5.086	.000*	.136
	Painting	88	3.68	.51			
Knowledge, Media and Technology Skills	Music	77	4.08	.67	2.354	.020*	.032
	Painting	88	3.86	.57			
Overall Scale	Music	77	4.00	.46	3.970	.000*	.088
	Painting	88	3.72	.46			

*p<0.05

Table 9 shows that there is a statistically significant difference in 21st-century skills competency perceptions according to the department variable *(t = 3.970, p < .05)*.

When the sub-factors are examined, the department variable also produced statistically significant differences in learning and innovation skills *(t = 2.401, p < .05)*, life and career skills *(t = 5.086, p < .05)*, and information, media, and technology skills *(t = 2.354, p < .05)*.

These differences favor students in the music department both in the overall scale and in all sub-dimensions. The mean score of music department students is higher *(M = 4.00)*.

Examination of the eta-squared effect sizes indicates a medium effect size for the overall scale *(η^2 = .088)*, small effect sizes for learning and innovation skills *(η^2 = .030)* and information, media, and technology skills *(η^2 = .032)*, and a large effect size for life and career skills *(η^2 = .136)*, according to Cohen's (1988) classification.

3.1.2. Do competency perceptions regarding 21st-Century Skills differ according to grade level?

The results of the ANOVA analysis examining whether students' perceptions of 21st-Century Skills competency differ according to grade level are presented in Table 10.

Table 10

ANOVA test results for perceptions of 21st Century Skills proficiency and sub-factors

Sub-factors	Grade	N	M	SD	F	p	Difference	η²
Learning and Innovation Skills	1	42	3.97	.54	3.675	.013*	1 > 4	.064
	2	41	.81	.61				
	3	45	3.75	.44				
	4	37	3.58	.50				
Life and Career Skills	1	42	4.03	.51	3.408	.019*	1 > 4	.060
	2	41	3.87	.52				
	3	45	3.85	.49				
	4	37	3.66	.51				
Knowledge, Media and Technology Skills	1	42	4.12	.69	2.305	.079	–	–
	2	41	3.98	.65				
	3	45	3.98	.53				
	4	37	3.76	.59				
Overall Scale	1	42	4.03	.50	4.439	.005*	1 >4 2>4	.076
	2	41	3.87	.51				
	3	45	3.84	.37				
	4	37	3.65	.44				

*p<0.05

Table 10 shows that 21st-century skills competency perceptions differ significantly according to the grade level variable *(F = .439, p < .05)*. This finding indicates that grade level significantly influences students' perceptions of 21st-century skills.

Post hoc comparisons using the LSD test revealed that the difference was in favor of first-year students compared to fourth-year students *(M = 4.03, SD = .50)*, and in favor of second-year students compared to fourth-year students *(M = 3.87, SD = .51)*.

Examination of the effect size indicates a moderate effect for the overall scale *(η^2 = .076)*.

In terms of sub-dimensions, for learning and innovation skills, a significant difference was observed in favor of first-year students compared to fourth-year students *(M = 3.97, SD = .54)*. Similarly, for life and career skills, a significant difference was found in favor of first-year students compared to fourth-year students *(M = 4.03, SD = .51)*.

The effect sizes for these sub-dimensions were also at a moderate level *(η^2 = .064; η^2 = .060)*.

3.1.3. Do the 21st-Century Skills competency perceptions of students studying art education differ according to the gender variable?

The results of the independent samples t-test examining whether students' perceptions of 21st-Century Skills competency differ according to gender are presented in Table 11.

Table 11

T-test results for 21st-Century Skills competency perceptions and sub-factors

Sub-factors	Gender	N	M	SD	t	p
Learning and Innovation Skills	Female	104	3.80	.57	.757	.450
	Male	61	3.73	.48		
Life and Career Skills	Female	104	3.86	.55	.172	.864
	Male	61	3.85	.46		
Knowledge, Media and Technology Skills	Female	104	3.98	.64	.433	.666
	Male	61	3.94	.59		
Overall Scale	Female	104	3.86	.51	.534	.594
	Male	61	3.82	.41		

Table 11 presents the results of the independent samples t-test conducted to examine whether students' perceptions of 21st-century skills competency differ according to gender.

According to the findings, no statistically significant differences were found between female and male students in any of the sub-dimensions or in the overall scale *(p > .05)*.

In the learning and innovation skills dimension, although female students *(M = 3.80, SD = .57)* scored slightly higher than male students *(M = 3.73, SD = .48)*, this difference was not statistically significant *(t = .757, p = .450)*.

Similarly, in the life and career skills dimension, the mean scores of female *(M = 3.86, SD = .55)* and male students *(M = 3.85, SD = .46)* were nearly identical, and no significant difference was observed *(t = .172, p = .864)*.

In the information, media, and technology skills dimension, female students *(M = 3.98, SD = .64)* scored slightly higher than male students *(M = 3.94, SD = .59)*; however, the difference was not statistically significant *(t = .433, p = .666)*.

Likewise, no statistically significant difference was found in the overall scale scores *(t = .534, p = .594)*, indicating that gender does not have a meaningful effect on students' perceptions of 21st-century skills competency.

Overall, these results suggest that students' perceptions of 21st-century skills competency are similar regardless of gender, and that gender is not a determining variable in this context.

3.2. What are the critical thinking tendencies of students receiving art education?

The descriptive analysis results for the overall Critical Thinking Tendencies Scale for students receiving art education are presented in Table 12.

Table 12

Descriptive statistical results for the critical thinking tendencies scale and its sub-factors

Sub-factors	M	SD	Level
Metacognition	3.90	.61	Mostly Agree
Flexibility	3.85	.62	Mostly Agree
Systematicity	3.92	.55	Mostly Agree
Determination and Patience	3.85	.60	Mostly Agree
Open-mindedness	3.81	.85	Mostly Agree
Overall Scale	3.86	.53	Mostly Agree

Table 12 presents the descriptive statistical results of the Critical Thinking Tendencies Scale and its sub-factors.

According to the findings, the overall mean score of the scale is *(M = 3.86, SD = .53)*, corresponding to the "mostly agree" level. This indicates that students generally demonstrate a positive tendency toward critical thinking.

When the sub-factors are examined, the highest mean score is observed in the systematicity dimension *(M = 3.92, SD = .55)*, followed by metacognition *(M = 3.90, SD = .61)*. These findings suggest that students tend to approach problems in an organized manner and possess awareness of their own thinking processes.

The flexibility *(M = 3.85, SD = .62)* and determination and patience *(M = 3.85, SD = .60)* dimensions have similar mean scores, indicating that students moderately exhibit adaptive thinking and persistence in problem-solving.

The lowest mean score is found in the open-mindedness dimension *(M = 3.81, SD = .85)*, although it still falls within the "mostly agree" level. This suggests that while students are generally open to different perspectives, this tendency is relatively less pronounced compared to other dimensions.

Overall, all sub-dimensions are at the "mostly agree" level, indicating that students demonstrate generally positive critical thinking tendencies across all dimensions.

3.2.1. Do the critical thinking tendencies of students studying art education differ according to the department variable?

The t-test results for the Students' Critical Thinking Tendencies Scale and its sub-factors are presented in Table 13.

Table 13

T-test results for the Critical Thinking Tendencies Scale and its sub-factors

Sub-factors	Department	N	M	SD	t	p	η²
Metacognition	Music	77	3.99	.62	1.761	.080	–
	Painting	88	3.82	.58			
Flexibility	Music	77	3.94	.63	1.652	.100	–
	Painting	88	3.78	.60			
Systematicity	Music	77	4.10	.55	4.257	.000*	.100
	Painting	88	3.75	.50			
Determination and Patience	Music	77	3.92	.57	1.382	.169	–
	Painting	88	3.79	.62			
Open-mindedness	Music	77	3.92	.90	1.561	.121	–
	Painting	88	3.71	.79			
Overall Scale	Music	77	3.93	.57	1.753	.081	–
	Painting	88	3.79	.48			

*p<0.05

Table 13 presents the results of the independent samples t-test conducted to examine whether students' critical thinking tendencies differ according to the department variable.

According to the findings, a statistically significant difference was found only in the systematicity sub-dimension *(t = 4.257, p < .001)*. Music students *(M = 4.10, SD = .55)* scored significantly higher than painting students *(M = 3.75, SD = .50)*. The effect size was moderate *(η² = .100)*, indicating a meaningful difference between the groups.

In contrast, no statistically significant differences were found in the other sub-dimensions, including metacognition *(p = .080)*, flexibility *(p = .100)*, determination and patience *(p = .169)*, and open-mindedness *(p = .121)*. Similarly, no significant difference was observed in the overall scale scores *(t = 1.753, p = .081)*.

Although music students generally have higher mean scores across all sub-dimensions compared to painting students, these differences are not statistically significant except for the systematicity dimension.

Overall, the results indicate that the department variable has a limited effect on students' critical thinking tendencies, with a significant difference observed only in systematic thinking skills.

3.2.2. Do students' critical thinking tendencies differ according to grade level?

The results of the ANOVA analysis examining whether students' critical thinking tendencies differ according to grade level are presented in Table 14.

Table 14

ANOVA test results for the critical thinking tendencies scale and its sub-factors

Sub-factors	Grade	N	M	SD	F	p	Difference	η^2
Metacognition	1	42	4.10	.65	2.169	.094	–	–
	2	41	3.84	.70				
	3	45	3.83	.50				
	4	37	3.81	.52				
Flexibility	1	42	4.01	.62	1.469	.225	–	–
	2	41	3.84	.73				
	3	45	3.81	.49				
	4	37	3.74	.60				
Systematicity	1	42	4.02	.60	1.203	.310	–	–
	2	41	3.93	.56				
	3	45	3.92	.54				
	4	37	3.79	.50				
Determination and Patience	1	42	3.88	.60	3.926	.010*	1 > 4 2 > 4 3 > 4	.068
	2	41	4.05	.56				
	3	45	3.86	.61				
	4	37	3.59	.55				
Open-mindedness	1	42	3.86	.97	.784	.505	–	–
	2	41	3.90	.77				
	3	45	3.84	.80				
	4	37	3.63	.84				
Overall Scale	1	42	4.00	.56	2.267	.083	–	–
	2	41	3.90	.59				
	3	45	3.82	.45				
	4	37	3.70	.48				

*p<0.05

Table 14 presents the results of the one-way ANOVA conducted to examine whether students' critical thinking tendencies differ according to grade level.

According to the findings, a statistically significant difference was found only in the determination and patience sub-dimension *(F = 3.926, p = .010)*. Post hoc comparisons revealed that first-, second-, and third-year students scored significantly higher than fourth-year students *(1 > 4; 2 > 4; 3 > 4)*. The effect size was moderate *(η^2 = .068)*.

In contrast, no statistically significant differences were found in the other sub-dimensions, including metacognition *(p = .094)*, flexibility *(p = .225)*, systematicity *(p = .310)*, and open-mindedness *(p = .505)*.

Similarly, no significant difference was observed in the overall scale scores *(F = 2.267, p = .083)*, indicating that students' overall critical thinking tendencies do not significantly differ across grade levels.

Although first-year students generally have higher mean scores across most sub-dimensions, these differences are not statistically significant except for the determination and patience dimension.

Overall, the findings suggest that grade level has a limited effect on students' critical thinking tendencies, with a significant difference observed only in persistence-related skills.

3.2.3. Do the critical thinking tendencies of students in art education differ according to the gender variable?

The t-test results for the critical thinking tendencies scale and sub-factors are shown in Table 15.

Table 15

T-test results for the critical thinking tendencies scale and sub-factors

Sub-factors	Gender	N	M	SD	t	p
Metacognition	Female	104	3.97	.60	1.899	.059
	Male	61	3.78	.61		
Flexibility	Female	104	3.89	.62	1.015	.311
	Male	61	3.79	.63		
Systematicity	Female	104	3.90	.57	-.461	.645
	Male	61	3.94	.53		
Determination and Patience	Female	104	3.87	.61	.434	.665
	Male	61	3.83	.58		
Open-mindedness	Female	104	3.85	.83	.778	.438
	Male	61	3.74	.89		
Overall Scale	Female	104	3.89	.54	1.180	.240
	Male	61	3.79	.51		

Table 15 presents the results of the independent samples t-test conducted to examine whether students' critical thinking tendencies differ according to gender.

According to the findings, no statistically significant differences were found between female and male students in any of the sub-dimensions or in the overall scale *(p > .05)*.

In the metacognition dimension, female students *(M = 3.97, SD = .60)* scored higher than male students *(M = 3.78, SD = .61)*; however, this difference was not statistically significant *(t = 1.899, p = .059)*, although it is close to the significance threshold.

Similarly, no significant differences were found in flexibility *(t = 1.015, p = .311)*, systematicity *(t = –.461, p = .645)*, determination and patience *(t = .434, p = .665)*, and open-mindedness *(t = .778, p = .438)*.

In the overall scale, female students *(M = 3.89, SD = .54)* scored slightly higher than male students *(M = 3.79, SD = .51)*; however, this difference was also not statistically significant *(t = 1.180, p = .240)*.

Overall, these findings indicate that gender does not have a statistically significant effect on students' critical thinking tendencies, and that both groups demonstrate similar levels across all dimensions.

3.3. Is there a relationship between the 21st-Century Skills competency perceptions of students studying art education and their critical thinking tendencies?

The results of the Pearson correlation analysis, which reveal whether there is a relationship between students' perceptions of 21st-Century Skills competencies and their critical thinking tendencies, are presented in Table 16.

Table 16

Pearson correlation analysis results regarding students' perceptions of 21st-Century Skills competencies and critical thinking tendencies

Variables	**CTTS (Total)**
21st-Century Skills (Total)	.707**
Learning and Innovation Skills	.579**
Life and Career Skills	.639**
Knowledge, Media and Technology Skills	.615**
Critical Thinking Sub-dimensions	21st Skills (Total)
Metacognition	.655**
Flexibility	.656**
Systematicity	.855**
Determination and Patience	.492**
Open-mindedness	.354**

**p < .01

Table 16 presents the results of the Pearson correlation analysis examining the relationships between students' perceptions of 21st-century skills competencies and their critical thinking tendencies.

According to the findings, there is a positive and statistically significant relationship between the overall 21st-century skills competency perceptions scale (21stCSCPS) and the critical thinking tendencies scale (CTTS) *(r = .707, p < .01)*. This result indicates that as students' perceptions of 21st-century skills increase, their critical thinking tendencies also increase.

When the sub-dimensions are examined, all dimensions of 21st-century skills show positive and significant correlations with critical thinking tendencies. Specifically, learning and innovation skills *(r = .579, p < .01)*, life and career skills *(r = .639, p < .01)*, and information, media, and technology skills *(r = .615, p < .01)* are all moderately and positively correlated with CTTS.

Among the critical thinking sub-dimensions, the strongest relationships with 21st-century skills are observed in flexibility *(r = .895, p < .01)*, systematicity *(r = .893, p < .01)*, and open-mindedness *(r = .752, p < .01)*, indicating high levels of positive correlation.

Overall, these findings demonstrate moderate to high positive relationships between the variables. Students who perceive themselves as more competent in 21st-century skills also tend to exhibit stronger critical thinking tendencies, highlighting a strong and meaningful association between these two constructs.

4. CONCLUSION AND DISCUSSION

4.1. Students' Perceptions of 21st-Century Skills Competency in Art Education and Their Variation by Demographic Variables

It is observed that students in art education programs have generally positive perceptions of their 21st-century skills competency, with mean scores at the "mostly agree" level (Table 8). This finding indicates that

students perceive themselves as competent in areas such as learning and innovation, life and career skills, and knowledge, media, and technology skills.

This finding is consistent with previous research in the literature. Uyar and Çiçek (2021) reported that teachers from different disciplines, including music and visual arts, have high levels of 21st-century skills. Similarly, Tutal (2023) found that teacher candidates, including those in art and music education, demonstrated high levels of 21st-century skills both in the overall scale (M = 4.04) and across all sub-dimensions. Canpolat (2021) also reported that teacher candidates' 21st-century skills were at a high level, supporting the present findings. Likewise, Kozikoğlu and Altunova (2018) determined that fine arts teacher candidates had high levels of self-efficacy perceptions in learning and innovation, life and career, and information, media, and technology skills. Similarly, Öpengin and Elmas (2023) found that teacher candidates in art education and other fields had high levels of 21st-century skills teaching competencies and creative self-efficacy.

However, Gökbulut (2020) reported high positive results in the sub-dimensions of "Information, Media, and Technology Skills" and "Life and Career Skills," while only moderate positive results were found in the "Learning and Renewal Skills" sub-dimension. This partially differs from the findings of the present study, which revealed high perception levels across all dimensions.

When the sub-factors of 21st-century skills competency perceptions are examined according to the department variable, statistically significant differences were found in the sub-dimensions of learning and innovation skills ($t = 2.401$; $p < .05$), life and career skills ($t = 5.086$; $p < .05$), and information, media, and technology skills ($t = 2.354$; $p < .05$). Examination of eta-squared values indicates a medium effect size for the overall scale ($\eta^2 = .088$), small effect sizes for learning and innovation skills ($\eta^2 = .030$) and information, media, and technology skills ($\eta^2 = .032$), and a large effect size for life and career skills ($\eta^2 = .136$). These findings are consistent with Cohen's (1988) classification of effect sizes. In contrast, Öpengin and Elmas (2023) reported no significant differences in 21st-century skills according to the department variable.

In terms of grade level, a statistically significant difference was found in students' perceptions of 21st-century skills competency ($p < .05$). The LSD post-hoc test results indicated that the difference was in favor of first-year students compared to fourth-year students ($M = 4.03$; $SD = .50$) and in favor of second-year students compared to fourth-year students ($M = 3.87$; $SD = .51$). The effect size for the overall scale was moderate ($\eta^2 = .076$). These findings are consistent with Öztürk (2023), who reported significant differences according to grade level. However, Gökbulut (2020) did not find a significant difference in overall 21st-century skills according to grade level, although third-year students scored higher in the "Information, Media, and Technology Skills" sub-dimension. Therefore, the findings of the present study are consistent with some previous studies while differing from others.

When examined according to the gender variable, no statistically significant difference was found in students' perceptions of 21st-century skills competency ($t = .534$; $p > .05$). This result is consistent with Tutal (2023), as well as Kozikoğlu and Altunova (2018), who reported that gender does not create significant differences in perceptions of 21st-century skills. However, Öztürk (2023) and Öpengin and Elmas (2023) reported significant differences according to the gender variable, which differs from the findings of the present study.

The absence of a gender-based difference in this study may also be interpreted in relation to the educational and cultural context in which the research was conducted. In contemporary higher education environments, particularly in art education programs, learning experiences are generally structured in a way that provides equal opportunities for participation, expression, and production regardless of gender. Studio-based practices, collaborative learning processes, and performance-oriented activities may contribute to minimizing gender-based differences by creating relatively similar learning conditions for all students.

Furthermore, the increasing emphasis on equality, inclusivity, and student-centered learning in higher education may have led to a more balanced development of both 21st-century skills and critical thinking tendencies among male and female students. From a cultural perspective, the transformation of gender roles and broader access to educational opportunities may also play a role in reducing potential differences between genders. In addition, variables such as individual interest, motivation, and engagement in artistic activities may have a stronger influence on these competencies than gender alone. Therefore, the absence of a significant difference in this study may reflect the multidimensional nature of both 21st-century skills and critical thinking, which are shaped by a combination of personal, educational, and contextual factors.

4.2. Students' Critical Thinking Tendencies in Art Education and Their Variation According to Demographic Variables

Students enrolled in art education programs were found to demonstrate critical thinking tendencies at the "mostly agree" level on the overall scale (M = 3.86; SD = .53). When the sub-dimensions are examined, students scored high in metacognition (M = 3.90; SD = .61), flexibility (M = 3.85; SD = .62), systematicity (M = 3.92; SD = .55), determination and patience (M = 3.85; SD = .60), and open-mindedness (M = 3.81; SD = .85). These findings indicate that students generally possess positive critical thinking tendencies across all dimensions.

This finding is consistent with Lampert (2006), who reported that arts education positively contributes to the development of critical thinking. However, Hayırsever and Oğuz (2017) found that teacher candidates had low levels of critical thinking tendencies, which differs from the findings of the present study. Similarly, Bağcı and Eraslan Taşpınar (2024) concluded that students demonstrated above-average critical thinking skills, although some sub-dimensions, such as hypothesis formation, were relatively lower.

When examined according to the department variable, no statistically significant difference was found in the overall Critical Thinking Tendencies Scale (t = 1.753; p > .05). Among the sub-dimensions, a significant difference was observed only in the systematicity dimension, in favor of the music department. This result supports Lampert's (2006) finding that arts education contributes to the development of critical thinking. Similarly, Luo (2024) emphasized that learning environments encouraging creativity and diverse perspectives enhance critical thinking, while Oreck (2004, 2006) highlighted the role of creativity in supporting critical thinking development. In contrast, Topoğlu and Ünal Öney (2013), Piji Küçük and Uzun (2013), and Başak and Yücel (2024) reported no significant differences according to the department variable.

In terms of the gender variable, no statistically significant difference was found in the present study (t = 1.180; p > .05). This finding is consistent with Piji Küçük and Uzun (2013), Başak and Yücel (2024), and Kılıç et al. (2017). However, Öztürk (2023) and Facione et al. (1995) reported gender-based differences in some sub-dimensions, and Al-Mahrooqi and Denman (2020) suggested that female students may demonstrate stronger critical thinking skills. These findings differ from the results of the present study.

When examined according to grade level, no statistically significant difference was found in the overall scale (F = 2.267; p > .05). A significant difference emerged only in the determination and patience sub-dimension. According to the LSD test results, first-, second-, and third-grade students scored higher than fourth-grade students. The effect size was moderate (η^2 = .068). This finding is similar to studies by Topoğlu and Ünal Öney (2013), Piji Küçük and Uzun (2013), Akyüzlüer (2014), and Başak and Yücel (2024), which reported no differences according to grade level. However, Lampert (2006), Al-Husban et al. (2022), and Çınardal et al. (2015) reported significant differences according to grade level, which differs from the findings of the present study.

Additionally, Erdem and Yazıcıoğlu (2015) found that teacher candidates' critical thinking tendencies were at an "undecided" level and that male students had higher tendencies than female students. This result differs from the present study, which found no gender-based differences. Similarly, Karalı (2012) reported that critical thinking levels were good and varied according to grade level, while Mahgoub (2021) emphasized that creativity enhances students' skills. On the other hand, Ekinci and Aybek (2010) found no significant differences according to class and gender variables, supporting the present findings. Likewise, Mermer and Can (2020) reported no gender differences among music teacher candidates. Coşkun Şentürk (2014) found that critical thinking tendencies were at a moderate level and improved after an experimental process, while Kürüm (2002) and Ayvaz (2018) reported moderate to high levels of critical thinking among art and music teacher candidates. These findings partially align with the results of the present study.

4.3. Overall Evaluation and the Relationship Between 21st-Century Skills and Critical Thinking

The findings of the study revealed a positive and statistically significant relationship between art education students' perceptions of 21st-century skills competency and their critical thinking tendencies (r = 0.707; p < .01). This result indicates that as students' perceptions of their 21st-century skills increase, their critical thinking tendencies also tend to increase.

This finding is consistent with previous research in the literature. Facione (2000) emphasized that critical thinking is one of the fundamental competencies required for success in both academic and social contexts. Similarly, Paul and Elder (2006) highlighted the central role of critical thinking in learning and problem-solving processes in the 21st century.

In addition, Mahgoub (2021) demonstrated that art education contributes to the development of critical thinking by fostering creativity. This finding can be considered a natural extension of the relationship between 21st-century skills and critical thinking tendencies in art education students. Furthermore, Luo (2024) emphasized that learning environments that support diverse perspectives positively influence both 21st-century skills and critical thinking. In this respect, the findings of the present study are consistent with the literature.

However, some studies have reported weaker relationships between these variables. For instance, Başak and Yücel (2024) found low levels of critical thinking among students in art education and history departments, which does not strongly support the expected relationship with 21st-century skills. Similarly, Piji Küçük and Uzun (2013) reported low levels in certain sub-dimensions of music teacher candidates' critical thinking tendencies, suggesting that the relationship with 21st-century skills may be limited. These findings differ from the moderate positive correlation identified in the present study.

Overall, it can be concluded that students in art education programs demonstrate relatively high levels of both 21st-century skills competency perceptions and critical thinking tendencies, and that there is a meaningful and positive relationship between these two variables. While many studies in the literature support this finding, some report lower levels of critical thinking tendencies, indicating that differences in sample characteristics and contextual factors may influence the strength of this relationship.

4.4. Limitations

This study has some limitations that should be considered when interpreting the findings. In this study, students from the music department were selected from Kırşehir Ahi Evran University, while students from the painting department were selected from Ege University. This preference was due to the absence of a painting education program at the institution where the study was conducted.

However, collecting data from different universities suggests that the observed differences may not be solely attributable to the department variable, but may also be influenced by factors such as institutional structure, educational approaches, and socio-cultural context.

The literature emphasizes that individuals' cognitive and attitudinal characteristics are shaped not only by individual variables but also by the educational environment and cultural context in which they are situated (Bronfenbrenner, 1979; Pascarella & Terenzini, 2005). The academic climate of universities, teaching approaches, and the socio-cultural characteristics of their surrounding environment can play a significant role in shaping students' thinking skills and learning approaches (Kuh, 2001).

Therefore, the departmental differences identified in this study should be interpreted with caution. Future research may yield more robust findings by comparing similar departments within the same university or across institutions with comparable socio-cultural characteristics.

5. RECOMMENDATIONS

The findings of the present study indicate that students in art education programs demonstrate relatively high levels of both 21st-century skills competency perceptions and critical thinking tendencies, as well as a positive and significant relationship between these variables. Within the limitations of the study, the following recommendations are proposed.

First, although the results provide important insights, they are limited to the sample of this study. Therefore, future studies conducted with larger and more diverse samples from different universities and departments may contribute to examining the consistency of these findings across different contexts and enhancing the external validity of the results.

Second, considering that students' competency perceptions differ across certain sub-dimensions (learning and innovation, life and career, and information, media, and technology skills), it is recommended that art education curricula incorporate project-based and problem-based learning scenarios. For example, students may be asked to develop an artistic product (such as a musical composition or visual design) addressing a real-life social issue, present their work, and evaluate both their own and their peers' products based on structured criteria. Such practices may simultaneously support creativity, problem-solving, and critical thinking skills.

Third, to support the development of digital and information-related competencies, it is recommended that digital tools and platforms be systematically integrated into art education courses. Applications such as digital music production software, visual design programs, and e-portfolio systems can be used to enable students to document, reflect on, and present their learning processes, thereby enhancing both technological skills and reflective thinking.

Fourth, the differences observed according to grade level suggest that students' competency perceptions may vary throughout the educational process. In this regard, it is recommended that course content be structured progressively across grade levels, incorporating increasing levels of complexity, autonomy, and critical engagement. For instance, while lower-grade students may focus on guided practice and basic skill development, upper-grade students may be engaged in independent, interdisciplinary, and research-based artistic projects.

Fifth, given the positive and significant relationship identified between 21st-century skills and critical thinking tendencies, it is recommended that learning environments be designed to foster both domains simultaneously. In this context, instructional strategies such as reflective discussions, peer feedback sessions, and open-ended questioning can be incorporated into studio-based courses to encourage students to articulate, justify, and critically evaluate their ideas and artistic productions.

In terms of contributions to the field, this study provides empirical evidence on the relationship between 21st-century skills and critical thinking tendencies specifically within the context of art education. In this respect, it contributes to the literature by addressing these two constructs together and by offering data-based insights into how they relate to each other within this specific educational domain.

Finally, for future research, it is recommended that studies be designed to examine this relationship in greater depth by including additional variables such as motivation, self-regulation, and learning strategies. Moreover, employing qualitative or mixed-method approaches may provide a more comprehensive understanding of students' experiences and the underlying factors influencing both 21st-century skills and critical thinking tendencies.

Ethical approval

The study was approved by Scientific Research and Publication Ethics Committee of Social and Human Sciences at Kırşehir Ahi Evran University (date: 14.05.2025, number: 2025/09/13).

Author contribution

Study conception and design: ŞA; data collection: ŞA; analysis and interpretation of results: ŞA; draft manuscript preparation: ŞA. Author reviewed the results and approved the final version of the article.

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The author declare that there is no conflict of interest.

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