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Dönüştürücü Potansiyeli Keşfetmek: Görsel Sanatlarda Analitik ve Eleştirel Düşünmeyi Geliştiren Ters-Yüz Öğrenme Modeli

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Öz

Bu araştırmada Görsel Sanatlar dersi programında yer alan "perspektif" konusunun ters yüz öğrenme modeli ile verilmesinin öğrencilerin eleştirel ve analitik düşünme becerileri üzerindeki etkisini incelemek ve bu etkiyi, geleneksel öğrenme yöntemiyle karşılaştırmak amaçlanmıştır. Araştırmada ön test – son test kontrol gruplu yarı deneysel desen kullanılmıştır. Araştırmanın örneklemini özel bir kolejde öğrenim gören 50 adet 10. sınıf öğrencisi oluşturmaktadır. Araştırma kapsamında rastgele seçilen sınıflardan birinde geleneksel öğretim yöntem ve teknikleri, diğerinde ise ters yüz öğrenme modeli uygulanmıştır. Araştırma verileri Ocak ve Park (2020) tarafından geliştirilen "Lise Öğrencilerinin Analitik Düşünme Ölçeği" ve Eğmir ve Ocak (2016) tarafından geliştirilen "Eleştirel Düşünme Becerisini Ölçmeye Yönelik Başarı Testi" kullanılarak toplanmıştır. Elde edilen verilerin analizinde; deney ve kontrol gruplarının birbirleri ile karşılaştırılmasında Mann Whitney-U Testi, her bir grubun kendi içinde karşılaştırılmasında ise Wilcoxon İşaretli Sıralar Testi kullanılmıştır. Araştırma sonucunda her iki grupta da öğrencilerin eleştirel düşünme becerileri ile analitik düşünme becerileri ve tüm alt boyutlarında ön test-son test puanları arasında son testler lehine anlamlı fark bulunmuştur. Bununla birlikte ters yüz öğrenme modeli ile görsel sanatlar dersinin öğretiminin, geleneksel yöntemlere göre öğrencilerin analitik düşünme becerileri ve eleştirel düşünme becerilerini istatistiksel olarak anlamlı olacak şekilde daha fazla geliştirdiği görülmüştür. Araştırmadan elde edilen sonuçlar doğrultusunda ters yüz öğrenme modelinin öğrencilerin üst düzey becerilerinin geliştirilmesinde etkili bir yöntem olduğu sonucuna ulaşılmış, bu kapsamda gelecekte yapılacak çalışmalara yönelik çeşitli önerilerde bulunulmuştur.

Anahtar Kelimeler

Ters-yüz Öğrenme Modeli, Görsel Sanatlar Eğitimi, Analitik Düşünme Becerisi,

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Exploring the Transformative Potential: Flipped Learning Unleashes Analytical and Critical Thinking in Visual Arts

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Abstract

This study aims to compare the impact on students' critical and analytical thinking skills in teaching the topic of "perspective" in the Visual Arts curriculum using the flipped learning model versus the traditional learning method. The study employed a quasi-experimental pre- and post-test control-group design. Fifty 10th-grade students from a private high school were included in the sample. Traditional teaching methods and techniques were utilized in one randomly selected class, whereas the flipped learning model was used in the other class. The "Analytical Thinking Scale for High School Students" created by Ocak and Park (2020) and the "Achievement Test Towards Evaluating Critical Thinking Skills" created by Emir and Ocak (2016) were used to collect data. The Mann–Whitney U test was used to compare the experimental and control groups, whereas the Wilcoxon Signed-Rank Test was used to compare the data within each group. A comparison of the pre-and post-test scores of both groups revealed significant improvements in their critical thinking and analytical thinking abilities, as well as in all sub-dimensions. In addition, it was observed that teaching a visual arts course using the flipped learning model significantly improved students' analytical and critical thinking abilities compared to traditional methods. Considering all these findings, it is possible to conclude that the flipped learning model is an effective strategy for fostering the development of students' higher-order skills. The study concludes with several suggestions for future research in this field.

Keywords

Flipped Learning Model, Visual Arts Education, Analytical Thinking Skills, Critical Thinking Skills

Citation

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Introduction

To cope with the challenges of the modern world, the development of individuals' high-level thinking skills is a key focus in today's education system. Incorporating different teaching methods and techniques (Roca et al., 2016; Wang & Seepho, 2017; Westhuizen & Rautenbach, 1997) and integrating current technologies (Coleman et al., 2017; Gouseti, 2014; Lin et al., 2017) into learning environments, as well as including interdisciplinary work (Caggy & Fischer, 2014; Cuervo, 2018; Vidergor, 2018) when planning instructional activities, are some of the steps taken by educators to facilitate this development. In this context, there has been a shift away from the traditional structure, where knowledge is presented to students in a ready-made form, and the roles of teachers and students have been redefined. Teachers have transitioned from being information providers to learning promoters who actively facilitate the knowledge construction of students (Hwang et al., 2015; Ji et al., 2022).

The role of technology in transforming students from passive to active is undeniable. Technology plays a crucial role in creating active learning environments that are research-based, support collaboration and group work, provide quick access to information, and allow learning at one's own pace in a desired environment (Wang & Hitch, 2017). Flipped learning (FL) is an instructional method that advocates restructuring the traditional classroom dynamics and integrating technology (O'Connor et al., 2016; Zhou, 2023). This method generally involves presenting pre-recorded instructional materials such as explanatory videos and readings to students before face-to-face classes (Kwon, 2021). In this way, more time can be allocated to interactive discussions and application activities in the classroom and personalized guidance support can be provided, leading to more effective use of time (Kwon, 2021; Murray et al., 2015). It is expected that students who come to classes equipped with prior knowledge will participate more actively in the lesson and engage more effectively in activities that require higher-order thinking (Shyr & Chen, 2018). In this context, FL has been increasingly implemented and researched in various disciplines, such as science, mathematics, language, and medical education, in recent years (Hao, 2016). Many educators have emphasized its positive effects on student achievement, engagement, satisfaction, problem-solving skills, and various higher-order thinking skills such as creativity, critical thinking, and analytical thinking (Alamri, 2019; Chao et al., 2015; Hao, 2016; Kozikoğlu, 2019; Nouri, 2016).

One of the subjects taught in schools to enhance students' visual and spatial skills is the visual arts (Goldsmith et al., 2016; Richards et al., 2019). Nowadays, visual arts classes are primarily taught through teacher-centered approaches, where students passively receive information, follow predetermined

instructions, and apply and experience techniques through demonstrations and practice. These traditional instructional environments often limit students' active participation and provide insufficient opportunities to use and develop higher-order cognitive skills, such as critically analyzing artwork, evaluating it from different technical perspectives, and producing original works. This problem can be addressed by incorporating active learning approaches into visual art education. One model that can be used for this purpose is the FL method. With this method, it is believed that student participation and motivation levels can be increased. By allowing students to take responsibility for their learning, their self-confidence and interest in the subject can grow, leading to the development of higher-order thinking skills (Bryan et al., 2011; Morris-Eyton & Pretorius, 2023). By integrating the FL method into visual arts classes, students can allocate more time to individual practice activities in the classroom and have opportunities to ask questions and participate in meaningful discussions. As their cognitive skills develop, students gain a deeper understanding of artistic techniques, historical contexts, and aesthetic principles, enabling them to think more analytically. Consequently, they can offer more meaningful interpretations and demonstrate a critical perspective by expressing themselves creatively. In this context, it is necessary to investigate the impact of the FL model in visual arts classes to enhance our understanding of effective instructional strategies and their contribution to students' cognitive development. Understanding the effects of the FL model on students' higher-order thinking skills, such as analytical and critical thinking, will provide valuable insights for developing innovative teaching programs and practices.

1. Literature Review

1.1. Flipped Learning Model

FL is an innovative educational approach that has attracted significant attention in recent years. This involves a reversal of the traditional classroom model, in which students engage with instructional content independently outside of class and then participate in collaborative activities and discussions during in-class sessions (Hwang et al., 2015). The concept of “flipped learning” has emerged as a response to the limitations of traditional lecture-based teaching methods. Educators have recognized the need for a more student-centered approach that encourages deeper understanding and critical thinking (Chaqmaqchee, 2021; Gorman, 2020). The term ‘flipped learning’ gained popularity in the early-mid 2000s when chemistry teachers Jon Bergman and Aaron Sams and Khan Academy founder Salman Khan contributed to its development and spread (Tsytovich & Boronenko, 2018).

In its most basic form, in the flipped classroom model, students perform activities outside the classroom that they would traditionally do (Asmara et al.,

2019). In this context, out-of-class activities that students are expected to perform are created in advance by educators and presented to them through information and communication technologies. Out-of-class materials are generally presented in the form of videos, PowerPoint presentations, screen recordings, podcasts, various online content and quizzes, computer simulations, and assignments (Nugraheni et al., 2022). By presenting the activities before the face-to-face learning process, students are allowed to prepare for the topic, which enables more effective use of time in the classroom. Thus, student-centered higher-order activities, such as problem-solving, discussion, analysis, developing a critical perspective, and exchanging ideas, can be facilitated in the classroom (Ash, 2012). In this respect, this model is considered important for the development of higher-order thinking skills. The contributions of the method to the learning process, when properly implemented, are summarized in Figure 1.

- **Active participation:** Students who can access learning materials before class are prepared for the lesson. Consequently, they transcend the role of passive listeners and actively engage in meaningful discussions.
- **Collaborative learning and peer interaction:** In-class activities often involve group work, tasks, and discussions, where students can share their ideas, explore different perspectives, and learn from each other. This supports the development of students' communication skills.
- **Flexibility:** Students can access learning materials anytime and from anywhere they prefer. Using commonly used learning management systems (LMS), they can communicate with their teachers outside the classroom and ask questions.
- **Individualized learning:** Students can learn at their own pace according to their individual learning needs. They can review the learning materials as much as they need. Technology-supported resources are designed to cater to different learning styles.
- **Personalized and immediate feedback:** With more time dedicated to one-on-one interactions in the classroom, teachers can spend more individualized time with their students and provide immediate feedback.
- **Meaningful learning:** When students come to a classroom equipped with prior knowledge, it allows for the inclusion of higher-level cognitive goals such as problem-solving, discussion, and the development of original products. This facilitates the students' internalization of knowledge.
- **Experiencing real-life situations:** With the allocation of time for practical applications, such as product development, problem-solving, and experimental procedures in the classroom, students can transfer their theoretical knowledge to real-life situations.
- **Development of digital competencies:** Through interacting with technology-supported learning materials in online learning environments, students develop technological literacy.

Figure 1

Contributions of the FL Model to the Learning Process

Upon reviewing the relevant literature, an upward trend can be observed in the number of national and international studies on the FL model. Examining the conducted research, studies investigating the impact of the model on students' academic achievements (Ahmed & Haji, 2020; Aybirdi et al., 2023; Aydin et al., 2020; Gu & Sok, 2021; Halasa et al., 2020; Karaca & Ocak, 2017;

Mukhlisa et al., 2021; Seitan et al., 2020; Sun & Wu, 2016; Wang, 2017), engagement (Ali Abu-gharara, 2020; Bergmann & Sams, 2015; Bond, 2020; Jamaludin & Osman, 2014; Pang, 2022; Paryani & Ramadan-Jradi, 2019; Ravandpour, 2022; Wang, 2017), and higher-level thinking skills (Day, 2018; İşçi & Yazıcı, 2023; Kim et al., 2017; Mas'ud & Surjono, 2018; Pardosi & Ming, 2022; Priyaadharshini & Vinayaga Sundaram, 2018; Rehman et al., 2022; Suprapti et al., 2021) have been encountered. Generally, these studies have focused on the impact of the model on academic achievement. There have also been studies examining the effects of this model on analytical and critical thinking skills separately (Agbo, 2022; Agustini et al., 2022; Arayathamsophon et al., 2020; Asmara et al., 2019; Fulgueras & Bautista, 2020; Kong, 2015; Phurikultong & Kantathanawat, 2022; Yulian, 2021). However, no research was discovered that evaluated the model's effects on two talents simultaneously. In this regard, both the suitability of the FL model for visual arts courses and the lack of sufficient research in this area have inspired investigations of the model's impact on students' analytical and critical thinking skills. This study was designed to address this gap in the literature.

1.2. Analytical and Critical Thinking Skills

Two important skills that modern learning approaches aim to develop in individuals are analytical and critical thinking. Analytical thinking is a form of thinking that involves breaking down a problem into its components to understand it, explaining the causes of problems and the steps of the solution, and critically evaluating the characteristics of two or more elements (Sternberg, 2006). This form of thinking is highly important, as it enables individuals to understand, generate solutions, and make decisions regarding the problems they encounter in their daily lives. Therefore, analytical thinking is one of the fundamental skills that modern learning approaches aim to cultivate. Based on the relevant literature, Art-In (2017) summarizes the characteristics of an individual who can think analytically, as shown in Figure 2.

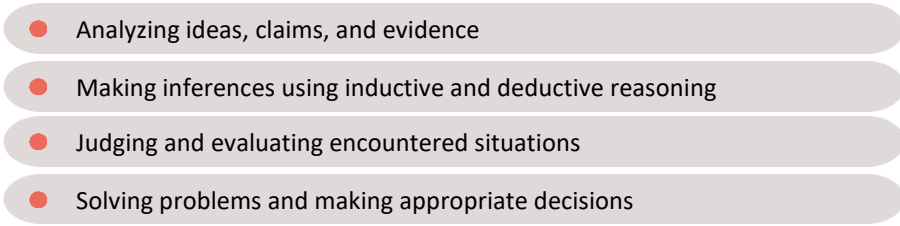

Figure 2

Characteristics of Analytical Thinkers

Another skill that is considered significant in terms of focusing on individuals' similar characteristics is critical thinking. Critical thinking enables individuals to identify problems, make inferences through logical reasoning, and make valid and reliable evaluations (Hosseini et al., 2012). Levy (1997) and Carter (2019) define critical thinking as an active and systematic cognitive approach that allows individuals to examine, judge, evaluate, generate solutions, and make decisions based on valid evidence. Idol and Jones (2013) correlated the cognitive steps of analysis, synthesis, and evaluation of Bloom's taxonomy with critical thinking skills. Considering that these steps are at higher taxonomic levels, it can be concluded that critical thinking demonstrates an individual's higher-order thinking skills. Ismail et al. (2018) emphasized the importance of individuals having critical thinking skills to solve problems they encounter in daily life and to compete with the changes in the industrial age.

Individuals with analytical and critical thinking skills have characteristics such as not accepting events as they are and having a questioning perspective. Therefore, it is considered highly important for individuals to have both critical and analytical thinking skills. Lai (2011) also emphasizes the importance of these skills, particularly in 21st-century knowledge societies. The FL learning method is a suitable approach to contribute to these skills. Styers et al. (2018) examined the effects of implementing active learning strategies in flipped life science classes on the development of student's critical thinking skills. They used methods and techniques that support active teaching, including process-oriented guided inquiry learning, model building, case studies, clicker-based think-pair-share strategies, and targeted critical thinking exercises in face-to-face classes. The results showed that FL enhanced the students' critical thinking skills. Another study conducted by Day (2018) showed that students in a flipped classroom for gross anatomy had an increase in semester average grades and performance on higher-level analytical questions compared with students in a traditional lecture. Other studies have also integrated FL with different teaching techniques in different disciplines, revealing its positive effects on students'

analytical (Arayathamsophon et al., 2020; Phurikultong & Kantathanawat, 2022) and critical thinking skills (Agbo, 2022; Munir et al., 2018; Nugraheni et al., 2022; Park & Park, 2018; Ravandpour, 2022; Sajid et al., 2016; Smith et al., 2018).

1.3. Visual Art Education

The visual arts course is taught at primary and secondary education levels in our country, aiming to enable students to understand and interpret art based on universal values, produce and evaluate artistic products, and embrace their cultural values while respecting the values of different societies (Kılıç et al., 2019). The specific goals of the visual arts course are for students to develop their visual perceptions, analyze and interpret works of art through multidimensional thinking, and have a universal mindset to evaluate artistic elements (Erkuzu & Çoban, 2018; Türkkan, 2011).

The visual arts course is directly related to individuals' skills in perception, analysis, multidimensional thinking, and critical thinking (Winner, 2007). The ability of students to interpret works of art through multidimensional thinking and examine them through different evaluation methods, which is among the course's specific goals, encourages them to think deeply, ask questions, and express their thoughts coherently and meaningfully. Aksoy and Gürbüz (2022) also emphasized the effectiveness of these cognitive skills, particularly analytical and critical thinking skills, in the visual arts courses in their study.

To achieve the goals of a visual arts course and develop students' analytical and critical thinking skills, it is crucial to incorporate instructional practices that can foster these skills. In this context, the idea that the FL method can contribute to students' analytical and critical thinking skills formed the basis for this research. Upon reviewing the relevant literature, it was found that this method has been used in a limited number of studies in the context of the visual arts course (Crişan & Albulescu, 2018). However, no study has been found that examined the impact of this method on the development of higher-order thinking skills, which are highly important in visual arts courses. Therefore, this study is considered significant in terms of demonstrating the applicability of the FL method in the visual arts course and its relationship with critical and analytical thinking skills, which are directly related to course objectives.

1.4. Current Study

This study aimed to examine the impact of teaching perspective topics in the visual arts curriculum using the FL model on 10th-grade students' analytical and critical thinking skills and to compare this impact with the traditional learning method. The research problem for this purpose is stated as follows: "What are the effects of using the FL model in visual arts classes on the analytical thinking

skills and their sub-dimensions of 10th-grade students?" The hypotheses of this study are as follows:

H1. There are no statistically significant differences between the pre-test scores obtained from the Analytical Thinking Scale and its sub-dimensions for the control and experimental groups participating in the research.

H2. There is a statistically significant difference in research in favor of the post-test scores compared to the pre-test scores regarding the group obtained from the Analytical Thinking Scale and its sub-dimensions for the control and experimental groups participating in the study.

H3. There is a statistically significant difference in favor of the experimental group participants in terms of the final test scores obtained from the Analytical Thinking Scale and its sub-dimensions in comparison with the control group participants.

H4. There is no statistically significant difference between the pre-test scores of the control and experimental groups in the Critical Thinking Skill Test.

H5. There is a statistically significant difference in favor of the post-tests in terms of the pre-to-post-test scores of the control and experimental groups that participated in the study, each within their groups.

H6. There is a statistically significant difference in favor of the experimental group in terms of the final test scores on the Critical Thinking Skills Test between the control and experimental groups that participated in the research.

Method

1. Research Model

In this study, one of the quasi-experimental designs, the non-equivalent (pre-test and post-test) control group design, was used. Within the scope of the study, one of the pre-existing classrooms in the practice school was randomly assigned to the control group, whereas the other was assigned to the experimental group. However, because the individuals participating in the research could not be randomly assigned to the classrooms, the study was considered to follow a quasi-experimental design (Creswell, 2014). The experimental design of the study is presented in Table 1.

Table 1

The Research Design

Group	Pre-test	Applied Method	Post-test
Experimental	Analytical Thinking Scale for High School Students Critical Thinking Skills Test	Flipped Learning Model	Analytical Thinking Scale for High School Students Critical Thinking Skills Test
Control		Traditional Teaching Methods	

The study aimed to reduce the potential confounding effects of these variables to a minimum by the students' socioeconomic levels being like each other in the two classrooms and the researcher conducting the classes in both groups, The in-class implementation phase of the research was conducted over a total of 12 class hours, each lasting 45 minutes. During this process, in the control group, the topic of perspective from the visual arts curriculum was taught using traditional teaching methods through face-to-face instruction. On the other hand, in the experimental group, the same topic was taught using the FL model.

2. Study Group

The study population consisted of 110 10th-grade students attending a private school in Istanbul during the 2021-2022 academic year. Likewise, the sample for the research was composed of 50 students attending 10th grade from the same school. The convenience sampling method was employed in the study because the sample was selected from students attending the school where one of the researchers was employed. The demographic characteristics of the participants are shown in Figure 3.

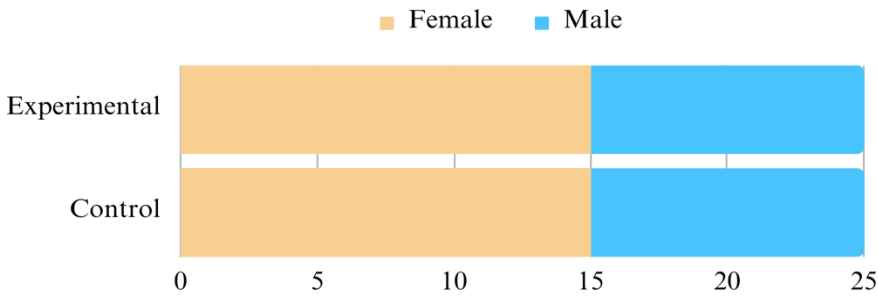

Figure 3

Demographic characteristics of the study groups

3. Research Instruments and Processes

Two measurement tools were used for the pre-test and post-test within the scope of the research. One is the *"Analytical Thinking Scale for High School Students,"* and the other is the *"Achievement Test Towards Evaluating Critical Thinking Skills."*

3.1. Analytical Thinking Scale for High School Students

The Analytical Thinking Scale for High School Students was an assessment tool developed by Ocak and Park (2020) to measure high school students' levels of analytical thinking skills. The scale is based on a 5-point Likert scale and consists of 24 items. The minimum possible score on the scale is 24, while the maximum score is 120. Information regarding the subscales and their scope is presented in (Figure 4). Cronbach's alpha coefficients for the subscales were 0.867, 0.840, 0.774, and 0.741, respectively. The overall reliability coefficient of the scale was 0.908, indicating that the scale was a reliable measurement tool (Grove & Cipher, 2019). In addition, in the validity studies conducted on the scale, confirmatory factor analysis showed that the goodness-of-fit indices were high, indicating that the scale was very consistent.

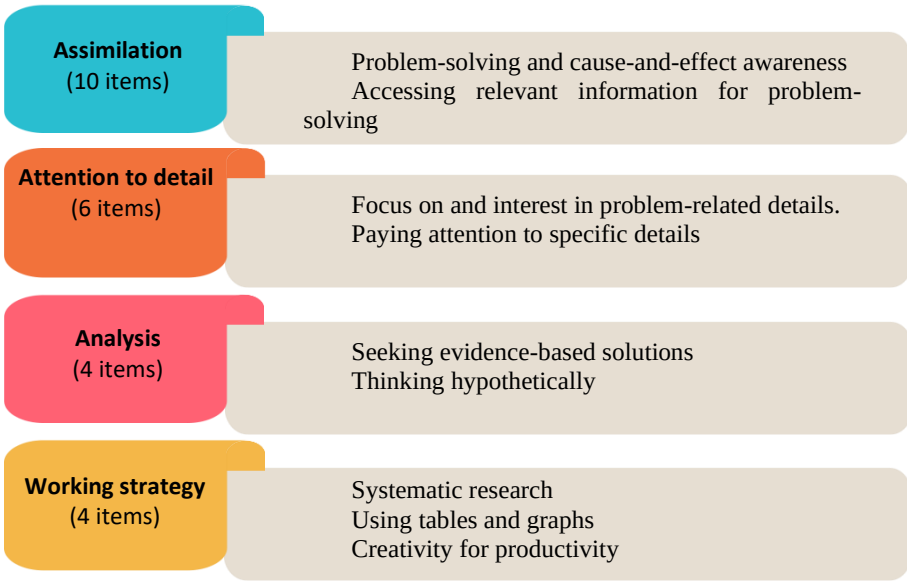

Figure 4

Analytical Thinking Scale Sub-Dimensions

3.2. Achievement Test Towards Evaluating Critical Thinking Skills

The "Achievement Test Towards Evaluating Critical Thinking Skills" is a test form developed by Eğmir and Ocak (2016) to measure students' critical thinking skills. The test includes scenarios that encompass everyday situations that students are likely to encounter, contain facts and problems aligned with the natural flow of life, and encourage the use of higher cognitive skills, such as reasoning. The test consists of 25 multiple-choice questions. Since this study was conducted with students at the 10th-grade level, a validity-reliability study was also conducted by the researchers to determine the appropriateness of the test for the study group. Accordingly, the test was administered to 323 students randomly selected from various secondary schools at the 10th-grade level. The validity-reliability procedures performed by the test developers in the original form were applied to the data in the same manner.

Accordingly, item difficulty and discrimination indices were initially calculated using the upper-lower group method. In this context, the group that obtained the highest scores, representing the top 27%, and the group that obtained the lowest scores, representing the bottom 27%, were identified to calculate the item difficulty and item discrimination indices. Based on the results, it was determined that the item difficulty indices ranged from 0.45 to 0.79 for all items, indicating that the items had a moderate-to-easy difficulty level. On the other hand, ranged from 0.36 to 0.75 for all items, indicating that the items were classified as good or very good. The KR-20 and KR-21 values for the entire 25-item test were also determined to be 0.86 and 0.83, respectively. Furthermore, the difficulty index for the overall test was 0.55, and the discrimination index was 0.51. These results indicate that the test had a moderate difficulty level and high discrimination for the sample used in the study (Haddad & Tylee, 2013; Waltz, 2005).

4. Data Collection and Experimental Procedures

At the beginning of the study, ethical committee approval, institutional permission, and permission for the use of data collection tools were obtained, and informed consent forms were collected from parents and students. Subsequently, data collection tools were administered to students as a pre-test using Google Forms. After the pre-tests were conducted, the control group received face-to-face instruction in the visual arts class following the traditional learning method, while the experimental group students were provided with access to the classroom created on Google Classroom. Participants in the experimental group accessed interactive lesson videos on Edpuzzle, one of the Web 2.0 tools, through their virtual classrooms. The researcher enriched the lesson videos with open-ended questions, multiple-choice questions, and hints. Thus, the monotony level of the videos was minimized, and an interactive nonlinear learning environment was created. The inclusion of guiding questions

in the videos aimed to increase students' awareness before the lesson and to provide them with different perspectives. The content of the lesson videos was the same as the face-to-face instruction content in the control group. The length of the videos was determined to be between 10 and 20 minutes, by the findings in the literature (Enfield, 2013; Petillion & McNeil, 2020; Reid, 2016). To ensure that students completed the video lessons without skipping any parts, the "Prevent Skipping" feature provided by Edpuzzle was activated for all videos. The lesson videos prepared by the researcher were uploaded to Edpuzzle at least a week before class. Sample visuals of the lesson videos used in this study are shown in Figure 5.

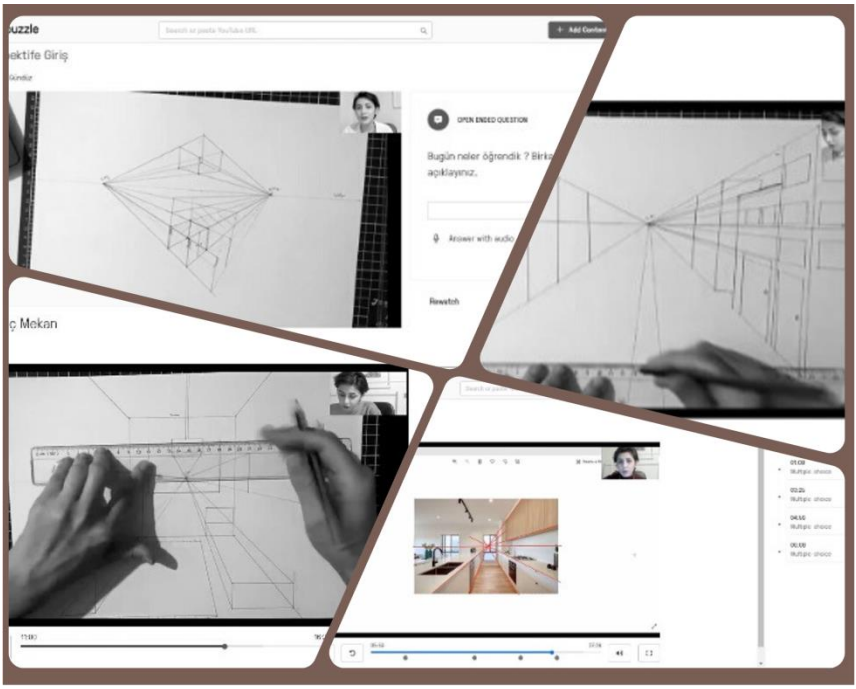

Figure 5

Sample Lecture Videos

In the experimental group, in-class activities were organized by collaborative and problem-based learning methods. In addition to the competencies included in the existing curriculum, cognitive tasks and activities are implemented at the levels of analysis, evaluation, and creation. In this context, the following application activities were added to the face-to-face instruction content in the experimental group.

- Understand the procedure for creating perspective drawings by analyzing them step by step.
- Comparing the use of perspective in various artistic periods
- Critical evaluation of the artwork from a perspective.
- Evaluation of the effect of perspective on adding depth and scale to a work of art.
- Evaluate your work from different perspectives.
- Creating perspective-based artwork.
- Using perspective to create an atmosphere and emotion in an artwork.
- Explore other artistic media that employ perspectives and develop their creative work.

After the six-week implementation period, the data collection tools used as pre-tests were administered as post-tests to both groups simultaneously through Google Forms. The experimental procedure performed in the study groups is summarized in (Figure 6, and Figure 7):

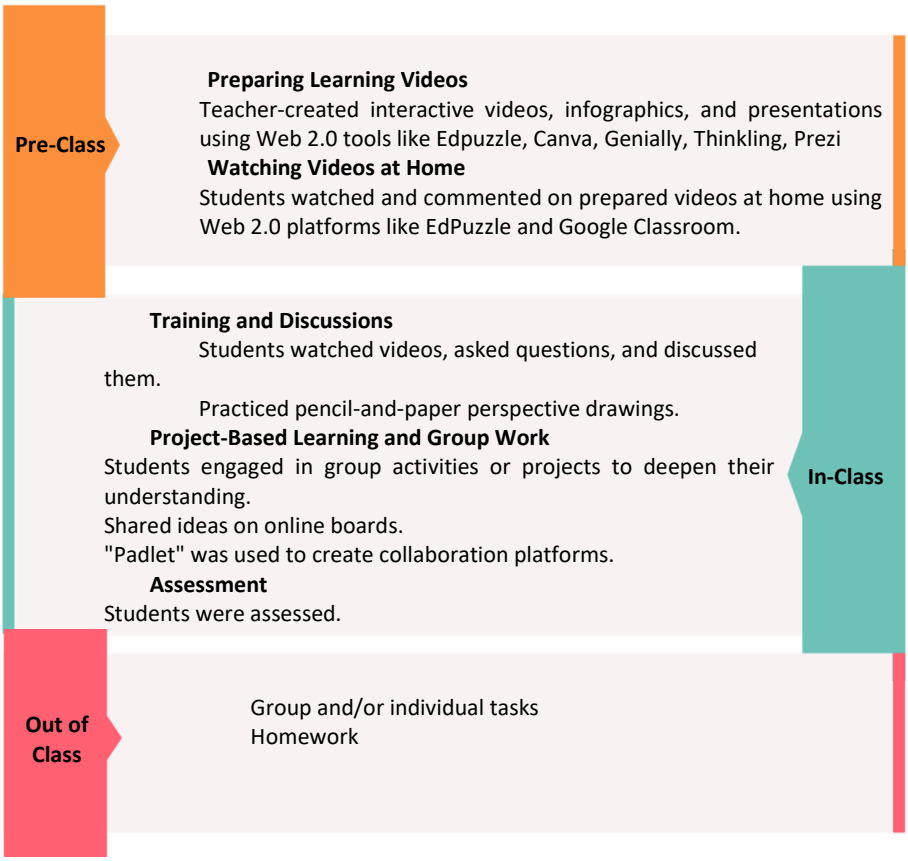

Figure 6

Flipped Learning Mode

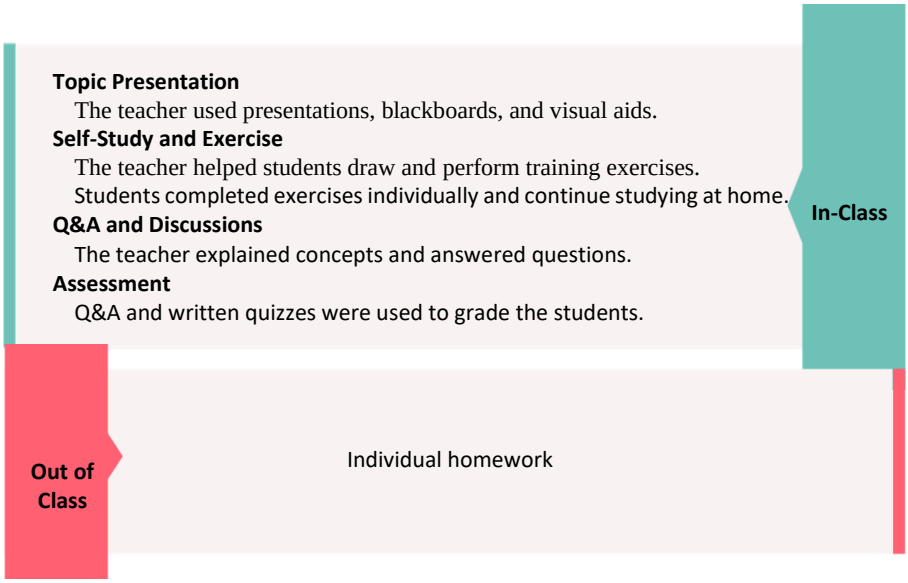

Figure 7

Traditional Model

5. Data Analysis

In this study, the SPSS 26 software package was used to analyze the quantitative data. When evaluating the scores obtained from the data collection tools, non-parametric tests were used without checking the assumption of normality of the data because the sample size was less than 30 in both the experimental and control groups. Accordingly, the Mann-Whitney U test was used to compare the groups, and the Wilcoxon Signed-Rank test was used to compare the pre-test and post-test scores within each group. The significance level was set at 0.05 for both tests.

Findings

The first hypothesis of the study is stated as *"There are no statistically significant differences between the pretest scores obtained from the Analytical Thinking Scale and its sub-dimensions of the control and experimental groups participating in the research."* Accordingly, the Mann-Whitney U-test results of the analytical thinking pre-test scores of the students in the experimental and control groups are shown in Table 2.

Table 2

Mann-Whitney U-Test Results According to The Analytical Thinking Pre-Test Results of The Students Who Participated in The Experimental and Control Groups.

Dimensions	Group	n	Mean Rank	Sum of Ranks	U	p
Assimilating Knowledge	Experimental	25	25.00	625.00	300.00	.808
	Control	25	26.00	650.00		
Attention to Detail	Experimental	25	27.86	696.50	253.50	.251
	Control	25	23.14	578.50		
Information Analysis	Experimental	25	26.02	650.50	299.50	.800
	Control	25	24.98	624.50		
Learning Strategy	Experimental	25	24.28	607.00	282.00	.552
	Control	25	26.72	668.00		
Overall	Experimental	25	25.58	639.50	310. 50	.969
	Control	25	25.42	635.50		

When Table 2 is examined, the findings show that there was *no statistically significant* difference between the analytical thinking skills, pre-test total scores, and sub-dimension scores of the experimental and control group students before the application (p>.05). This situation reveals that the students in both groups were similar in terms of their analytical thinking skill levels before the experimental process.

Therefore, any effect of the prior analytical thinking skills of the participants in the randomly selected research groups before the experimental study was minimized on the final test scores, which were applied after the experiments were conducted.

The second hypothesis of the study is as follows: *"There is a statistically significant difference in research in favor of the post-test scores when compared to the pre-test scores regarding the group obtained from the Analytical Thinking Scale and its sub-dimensions of the control and experimental groups participating in the study."* Accordingly, the Wilcoxon Signed Rank Test results are presented in Table 3, where the pretest and posttest results of the Analytical Thinking Test of the control and experimental group students are compared.

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Table 3

Wilcoxon Signed Rank Test Results of The Control and Experimental Groups by the Analytical Thinking Test Pretest-Posttest Results.

Group	Dimension	Pre-Post	n	Mean Rank	Sum of Ranks	z	p
Control	Assimilating Knowledge	Negative Rank	9	10.67	96.00	-1.792	.073
		Positive Rank	16	14.31	229.00		
		Tied	0	-	-		
	Attention to Detail	Negative Rank	7	11.00	77.00	-2.094	.036*
		Positive Rank	17	13.12	223.00		
		Tied	1	-	-		
	Information Analysis	Negative Rank	7	9.36	65.50	-1.200	.230
		Positive Rank	12	10.38	124.50		
		Tied	6	-	-		
	Learning Strategy	Negative Rank	8	12.19	97.50	-1.239	.215
		Positive Rank	15	11.90	178.50		
		Tied	2	-	-		
	Overall	Negative Rank	6	12.75	76.50	-2.317	.020*
		Positive Rank	19	13.08	248.50		
		Tied	0	-	-		
Experimental	Assimilating Knowledge	Negative Rank	5	9.40	47.00	-2.773	.006*
		Positive Rank	18	12.72	229.00		
		Tied	2	-	-		
	Attention to Detail	Negative Rank	4	5.75	23.00	-3.503	.000*
		Positive Rank	19	13.32	253.00		
		Tied	2	-	-		
	Information Analysis	Negative Rank	6	4.92	29.50	-3.001	.003*
		Positive Rank	15	13.43	201.50		
		Tied	4	-	-		
	Learning Strategy	Negative Rank	3	3.17	9.50	-4.018	.000*
		Positive Rank	21	13.83	290.50		
		Tied	1	-	-		
	Overall	Negative Rank	4	6.50	26.00	-3.674	.000*
		Positive Rank	21	14.24	299.00		
		Tied	0	-	-		

*p<.05

When Table 3 is examined, the difference between the "Attention to Detail" dimension scores (z = -2.094, p<.05) and the overall scores of analytical thinking (z = -2.317, p<.05) in the "Analytical Thinking Scale" of the control group students was found to be statistically *significant*. When the scores of the experimental group students were examined, it was observed that there was a statistically significant difference between the final test scores of analytical

thinking skills and the scores of all sub-dimensions, as well as the overall scores (p<.05). This finding demonstrates that both traditional and FL models significantly enhance students' analytical thinking skills in the context of the visual arts topic of perspective. When the findings are examined on a sub-dimension basis, it is understood that the FL model contributes more to the analytical thinking skills of students.

The statement regarding the third hypothesis of the study is as follows: *"There is a statistically significant difference in favor of the experimental group participants in terms of the final test scores obtained from the Analytical Thinking Scale and its sub-dimensions in comparison with the control group participants."* Accordingly, the Mann-Whitney U-Test results showing the analytical thinking final test scores of the experimental and control groups are presented in Table 4.

Table 4

Mann-Whitney U-Test Results for Experimental and Control Group Students' Analytical Thinking Final Test Scores

Dimensions	Group	n	Mean Rank	Sum of Ranks	U	p
Assimilating Knowledge	Experimental	25	28.40	710.00	240.00	.157
	Control	25	22.60	565.00		
Attention to Detail	Experimental	25	31.24	781.00	169.00	.005*
	Control	25	19.76	494.00		
Information Analysis	Experimental	25	30.40	760.00	190.00	.016*
	Control	25	20.60	515.00		
Learning Strategy	Experimental	25	32.86	821.50	128.50	.000*
	Control	25	18.14	453.50		
Overall	Experimental	25	30.86	771.50	178. 50	.009*
	Control	25	20.14	503.50		

*p<.05

When Table 4 was examined, there was a statistically *significant* difference in analytical thinking skills between students who learned the topic of perspective in the visual arts through the FL model and those who learned through the traditional education model in all the sub-dimensions except for the “Assimilating Knowledge” sub-dimension and in the total scores (p<.05). Considering the mean ranks for both sub-dimensions and the overall scale, it was observed that the students in the experimental group had higher levels of analytical thinking skills than those in the control group. This finding demonstrates the positive impact of the FL model on students' analytical thinking skills compared to traditional learning.

The fourth hypothesis of the study is: *"There is no statistically significant difference between the pre-test scores of the control and experimental groups in the Critical Thinking Skill Test."* Accordingly, the Mann-Whitney U test results based on the pre-test scores of the students in both groups on the Critical Thinking Test are presented in Table 5.

Table 5

Mann Whitney U-Test Results Based on The Pre-Test Scores on Critical Thinking of the Experimental and Control Group Students

Group	n	Mean Rank	Sum of Ranks	U	p
Experimental	25	27.72	693.00	257. 00	.280
Control	25	23.28	582.00		

Table 5 shows that there was no statistically significant difference between the critical thinking skill scores of the experimental and control group students who participated in the study before the intervention (U = 257.000, p>.05).

This situation reveals that before the experimental intervention, students in both groups showed similarities in terms of their levels of critical thinking skills. Therefore, the impact of the critical thinking skills the participants had possessed before the experimental procedure has been minimized on the final test scores to be conducted at the end.

The fifth hypothesis of the study can be stated as follows: *"There is a statistically significant difference in favor of the post-tests in terms of the pre-test to post-test scores of the control and experimental groups who participated in the study, each within their groups."* The Wilcoxon Signed-Rank test results for the within-group pre-test to post-test scores of the students in the experimental and control groups on the Critical Thinking Test are presented in Table 6.

Table 6

Wilcoxon Signed-Rank Test Results for The Pre-Test to Post-Test Scores on the Critical Thinking Test of Experimental and Control Group Students

Group	Pre-Post	n	Mean Rank	Sum of Ranks	z	p
Control	Negative Rank	1	21.00	21.00	-3.580	.000*
	Positive Rank	22	11.59	255.00		
	Tied	2	-	-		
Experimental	Negative Rank	0	0	.00	-4.296	.000*
	Positive Rank	24	12.50	300.00		
	Tied	1	-	-		

*p<.05

When examining Table 6, it can be observed that there was a statistically *significant* difference in the critical thinking skill scores of the students in both the experimental and control groups pre- and post-intervention. (p<.05). This finding demonstrates that both students who learned the topic of perspective in the visual arts through the FL model and those who learned through the traditional education model experienced a significant improvement in their critical thinking skills.

The sixth and final hypothesis of the study states that *"There is a statistically significant difference in favor of the experimental group in terms of the final test scores on the Critical Thinking Skills Test between the control and experimental groups who participated in the research."* Accordingly, the Mann–Whitney U-test results, conducted based on the pre-to post-test scores on the Critical Thinking Test for students in both groups, are presented in Table 7.

Table 7

Mann Whitney U-Test Results for the Final Test Scores on the Critical Thinking Skills of Experimental and Control Group Students

Group	n	Mean Rank	Sum of Ranks	U	p
Control	25	20.24	506.00	181.00	.010*
Experimental	25	30.76	769.00		

**p<.05*

When examining Table 7, it can be observed that there was a statistically significant difference in the critical thinking skills scores between students who learned the visual arts perspective through the FL model and those who learned through the traditional education model (U =181.000, p<.05). Considering the mean ranks it is obvious that the experimental group students had higher average scores than the control group students in terms of their analytical thinking skills. This finding indicates that teaching the perspective topic in the visual arts through the FL model significantly enhances the critical thinking skills of students compared to the traditional education model.

Discussion

The teaching of the perspective topic in the visual arts course program using the FL model increased students' analytical thinking skills statistically significantly more than traditional methods, as measured by total scores and all sub-dimension scores except "Assimilating Knowledge." In this sub-dimension, the FL method had a far greater positive effect on students' analytical thinking skills than the traditional methods.

Perspective is a challenging subject for students, because of its emphasis on spatial reasoning (Alkhalidi & Izani, 2017). Students must comprehend and represent precisely three-dimensional space on a two-dimensional surface. Realistic illustrations require precise measurements, proportions, and observations of small details. By blending face-to-face and distance learning methods, the FL paradigm provides an effective learning environment. In the FL model, in which learning begins outside the classroom, students enter classes with prior subject knowledge. This strategy improves in-class communication and permits more efficient time management (Arnold-Garza, 2014; Megha et al., 2023). FL frees up class time for more interactive and engaging activities, such as problem-solving, discussions, and group work (Ahmad, 2016; Giuliano & Moser, 2016). The current investigation tested the hypothesis that students' classroom discussions, particularly with their peers and teachers, contribute to their assimilation of information and attention to detail in the analysis. The flipped classroom strategy enhances self-regulated learning skills such as goal setting, planning, and time management among students (Jdaitawi, 2019; Linur & Mubarak, 2022). In this context, it is also anticipated that the FL method will enhance students’ working strategies.

The study concluded that students' analytical thinking skills improved in both flipped and traditional learning environments. This situation was not unexpected. Face-to-face teaching methods can still play a crucial role in students' skill development and learning experience, even in traditional classroom settings, where technology-supported active learning approaches may not be utilized. According to Cussler (2015), we will continue to rely on

traditional lecture methodologies, particularly in the applied fields. In the study, teaching perspective drawing with traditional methods in the visual arts course significantly improved one of the sub-dimensions of students' analytical thinking abilities, particularly the dimension of "attention to detail." To learn and practice perspective drawings, students must observe and analyze the details of the subject. Drawing from this perspective, students were taught to precisely depict spatial relationships, proportions, and angles. This method requires close attention to the subject's details, such as the positioning of lines, the convergence of parallel lines, and the foreshortening of objects. By focusing on these details, students develop observational skills and learn to recognize and accurately represent the complexities of the visual world. Attention to detail is essential for creating accurate and realistic illustrations. Developing students' attention to detail is an inevitable outcome of this procedure. By engaging with the perspective topic in the visual arts course, students learn to observe, analyze, and interpret visual information more effectively, which benefits them not only in their artistic endeavors but also in other fields that require attention to detail and analytical problem-solving abilities. The study of perspective in the visual arts course improves analytical reasoning by cultivating careful observation, critical analysis, and informed decision-making based on visual data. However, it is noteworthy that the improvement in students' analytical thinking skills was statistically significantly higher in FL environments than in traditional learning environments. As mentioned earlier, while traditional approaches to developing analytical skills have their merits, the FL approach also presents distinct advantages in supporting these skills. In the context of FL environments, it is a common practice to furnish students with instructional materials in advance, thereby enabling the utilization of class time for interactive engagements, discourse, and problem-solving endeavors. Through the utilization of active learning methodologies, students are allowed to engage with the course materials actively and profoundly, as well as to generate complex inquiries (Ansori & Nafi', 2018). In addition, the assimilation of conceptual knowledge can be efficiently utilized in real-world contexts, thus promoting a comprehensive understanding of the topic at hand.

Similarly, in FL environments, students can progress at personalized rates. The personalized nature of this educational experience may have contributed to a deeper understanding of the content (Pandow et al., 2020) and a greater development of students' cognitive skills (Birgili et al., 2021). FL also utilizes technology to augment learning beyond the confines of the traditional classroom environment. The incorporation of online resources, multimedia elements, and interactive tools holds the capacity to augment students' understanding of complex concepts (Mayer, 2014).

According to the study's outcomes, teaching perspective in a visual arts course using the FL model had a statistically significant and more positive effect on students' critical thinking skills than traditional classroom practices. This result is consistent with previous research demonstrating that the FL model improves students' higher-order cognitive skills, including critical thinking (Agustini et al., 2022; Ernawati et al., 2022; Fadli et al., 2022; Fulgueras & Bautista, 2020; Hwang et al., 2021), problem-solving (Iwaniec et al., 2017; Nederveld & Berge, 2015; Techanamurthy et al., 2020; Tung & Alissa, 2021), and creative thinking (Aznar-Díaz et al., 2020; Hsia et al., 2021; Karyadi et al., 2020). This result is primarily attributable to the fact that the model promotes active learning by exposing students to a variety of learning activities inside and outside the classroom, with the assistance of technology. However, the positive impact of the FL model on critical thinking skills may be attributed to several factors. Outside the class, students utilizing the FL model had access to course materials, particularly lecture videos. Thus, they can engage with the course material at their own pace and convenience. This circumstance may increase students' internalization of the subject through greater depth of comprehension. According to Xu and Shi (2018), in a flipped classroom, students are the primary cognitive body and the active constructors of meaning construction, thereby surpassing the limitations of traditional classrooms. Second, in the flipped classroom, the teacher devoted more class time to active learning techniques. To develop higher-order thinking skills, group discussions and brainstorming were used to maximize student participation and collaboration. Studies have demonstrated the positive effects of activities, such as debate and idea exchange, on students' critical thinking abilities (Hosseini et al., 2012; Kong, 2015; Pang, 2022; Yulian, 2021). Likewise, because the teacher did not present the information in class, she was able to encourage the students to draw more independently. Multiple studies have demonstrated that more face-to-face communication between instructors and students, and queries that prompt students to consider alternative perspectives, can foster critical thinking (Chin & Osborne, 2008; Milner-Bolotin et al., 2016; Sahin Dogruer, 2023). In addition, in the group where the FL model was implemented, students asked their teachers questions regarding topics they did not comprehend in class or via the message section of the learning management system. This situation, which encourages students to assume control and responsibility for their learning, can facilitate the development of their capacity for critical thought.

The research also improved students' critical thinking skills in traditional classroom settings. Although it is generally acknowledged that traditional learning environments are teacher-centered, classes can be structured to engage students, particularly through question-and-answer and group discussion techniques. According to McNeill and Pimentel (2010), open-ended

questions motivate students to compare, defend, and question their ideas about those of others. In addition, it is expected that students who attend the lesson attentively challenge themselves cognitively to assimilate the course material and engage in classroom dialogue with the teacher will develop their critical thinking skills. However, the findings of this study revealed that the critical thinking skills of students exhibited notable improvement in FL settings compared to traditional settings, like the enhancement observed in analytical thinking skills. This positive outcome can be attributed to the various advantages provided by the FL model, as highlighted in the preceding paragraph.

Conclusion and Suggestions

This study examined the impact of the FL model and traditional teaching methods on students' metacognitive thinking skills, specifically their critical and analytical thinking skills, on the topic of "perspective" in visual arts class. The results indicated that the FL model had a greater positive effect on students' skills than the traditional teaching methods. This finding can be attributed to the student-centered nature of the FL model, the creation of an environment based on questioning, the transfer of knowledge conducted at home with technology support, and the classroom providing opportunities for experiential learning with peers and teachers, as well as fostering interactive and social relationships. This research demonstrates that the FL model is a suitable approach for achieving the specific objectives of visual arts education. The results highlight the effectiveness of instructional methods and techniques based on a constructivist approach, such as the FL model, in equipping individuals with the necessary skills to meet the demands of the current era. Based on the evidence presented in this and similar studies, it is expected that the use of the FL model, which is a contemporary and suitable instructional model for current conditions, will be given more emphasis in learning environments, especially for enhancing higher-order thinking skills. This study demonstrated the suitability of the FL model for visual art education. In this context, it is necessary to move away from the traditional education model that is based on passive learning, where knowledge transfer solely occurs from teacher to student, and the source of information is limited to the teacher, and instead focus on contemporary education models that prioritize originality, inquiry, and critical and analytical approaches. The FL model, which aligns with the needs of the modern era, promotes active student involvement and learning through experience, rather than simply memorizing information.

Based on the results of this study, it is recommended that educators consider implementing the FL model in different learning environments to enhance students' higher-order cognitive skills. As this study examined the effectiveness of FL in teaching a specific subject, further research is needed to

expand our understanding of the potential benefits and limitations of the method in various subject areas and with diverse student populations.

This study examined the development of students' higher-order thinking skills using scale measurements. In future studies of a similar nature, the development of students can be assessed using different evaluation approaches compatible with FL, such as project-based assessments, portfolios, and authentic assessments.

The study was limited in terms of the number of participants in the intervention group and the duration of its implementation. It is recommended to conduct research with larger study groups over longer periods to obtain more generalizable results. Additionally, students' technical proficiency and attention skills may have had a confounding effect on this study. In future studies, these characteristics should be assessed before the intervention, and similar-level students should be included.

The visual arts teacher generated instructional materials, including lecture videos, for pre-lesson utilization in this research. To enhance the quality of educational materials, it is advisable to collaborate with proficient instructional technologists who possess expertise in creating captivating, brief, and intellectually stimulating content.

The visual arts course is designed to facilitate the effective execution of individual artistic applications. Active student participation in learning activities and independent exploration of applications, such as drawing and construction, are important. In the present context, the integration of the FL method with virtual and augmented reality applications within the visual arts course has the potential to capture students' attention and facilitate exceptional learning experiences.

The FL model relies heavily on technology to deliver instructional content outside the classroom. Therefore, educational institutions must provide educators and students with access to and support for the appropriate technological resources. Equal opportunities should be ensured for all participants in terms of internet connectivity and access to digital devices. To ensure the effective implementation of the FL method, it is recommended that the Ministry of National Education organize professional development programs, such as courses and workshops, to provide educators with the requisite knowledge and skills. Furthermore, to align with the FL approach, curricula can be expanded and revised to incorporate active learning strategies, such as in-class activities and discussions.

Limitations

This study was limited to a sample of 50 10th-grade students who were receiving visual arts education in a specific high school. The study focused on the perspective topic in a 10th-grade visual arts course and was conducted over six weeks, comprising 12 instructional hours. It was assumed that the students in the experimental group had the basic level of technological literacy required by the FL model. Additionally, it was assumed that the "Analytical Thinking Scale for High School Students" and the "Critical Thinking Skills Test" used in this research accurately measured the participants' levels of these skills.

Author Note

Author(s) Contributions: Author 1: 70%-Research design, Method, Literature review, Analysis, Results; Author 2: 30%-Literature review, Findings.

References

Agbo, O. A. (2022). The use of flipped learning model in enhancing critical thinking skills among Nigerian students. *British Journal of Education*, *10*(6), 89–95. https://doi.org/10.37745/bje.2013/vol10n6pp8995

Agustini, K., Santyasa, I. W., Tegeh, I. M., Santyadiputra, G. S., & Mertayasa, I. N. E. (2022). Quantum flipped learning and students' cognitive engagement in achieving their critical and creative thinking in learning. *International Journal of Emerging Technologies in Learning (IJET)*, *17*(18), Article 18. https://doi.org/10.3991/ijet.v17i18.32101

Ahmad, S. (2016). The flipped classroom model to develop Egyptian EFL students' listening comprehension. *English Language Teaching*, *9*(9), Article 9. https://doi.org/10.5539/elt.v9n9p166

Ahmed, S., & Haji, S. (2020). The effectiveness of using flipped learning strategy in the academic achievement by eight grade basic students in the subject of science and developing their reflective thinking. *Humanities Journal of University of Zakho*, *8*(2), Article 2. https://doi.org/10.26436/hjuoz.2020.8.2.597

Aksoy, Ş., & Gürbüz, M. (2022). Türkiye ve İngiltere'de ortaöğretim görsel sanatlar öğretiminin karşılaştırmalı olarak incelenmesi [A comparative analysis of secondary visual arts teaching in Turkey and England]. *Social Sciences: Theory & Practice*, *6*(2), Article 2. https://doi.org/10.48066/kusob.1200596

Alamri, M. M. (2019). Students' academic achievement performance and satisfaction in a flipped classroom in Saudi Arabia. *International Journal of Technology Enhanced Learning*, *11*(1), 103–119. https://doi.org/10.1504/IJTEL.2019.096786

Ali Abu-gharara, B. (2020). Flipped classroom technique: Engagement and value. *Bulletin of Advanced English Studies*, *4*(2), 32–39.

https://doi.org/10.31559/BAES2020.4.2.2

Arayathamsophon, R., Jedaman, P., & Jongmuanwai, B. (2020). Developed to basic Mathematic instructional activity of flipped mastery approach classroom via self-directed learning for supporting analytical thinking skills and achievement of 11 great students. *International Journal of Innovative Science and Research Technology*, *5*(9), 490–495. https://doi.org/10.38124/IJISRT20SEP341

Arnold-Garza, S. (2014). The flipped classroom teaching model and its use for information literacy instruction. *Communications in Information Literacy*, *8*(1), 7–22. https://doi.org/10.15760/comminfolit.2014.8.1.161

Art-In, S. (2017). Development of analytical thinking skills among Thai University students [Special Issue for INTE October 2017]. *TOJET: The Turkish Online Journal of Educational Technology*, 862–869.

Ash, K. (2012). Educators view "flipped" model with a more critical eye: Benefits and drawbacks seen in replacing lectures with on-demand video. *Education Week*, *32*(2), 6–8.

Asmara, R., Kusumaningrum, W. R., Wulansari, A., Munirah, & Hersulastuti. (2019). Measuring the effect of a flipped classroom model on critical thinking skills. *Proceedings of the 2nd Workshop on Language, Literature and Society for Education*, 1–6. https://doi.org/10.4108/eai.21-12-2018.2282743

Aybirdi, N., Efe, H., & Şal, Ç. A. (2023). The impact of flipped learning on L2 learners' achievements: A meta-analysis [Special issue]. *Shanlax International Journal of Education*, *11*(1), Article S1-Jan. https://doi.org/10.34293/education.v11iS1-Jan.5891

Aydin, M., Okmen, B., Sahin, S., & Kilic, A. (2020). The meta-analysis of the studies about the effects of flipped learning on students' achievement. *Turkish Online Journal of Distance Education*, *22*(1), Article 1. https://doi.org/10.17718/tojde.849878

Aznar-Díaz, I., Hinojo-Lucena, F.-J., Cáceres-Reche, M.-P., & Romero-Rodríguez, J.-M. (2020). Pedagogical approaches in the knowledge society: The flipped classroom method for the development of creativity and dialogical learning. *International Journal of Emerging Technologies in Learning (IJET)*, *15*(03), Article 03. https://doi.org/10.3991/ijet.v15i03.11664

Bergmann, J., & Sams, A. (2015). *Flipped learning: Gateway to student engagement* (1st edition). International Society for Technology in Education.

Bond, M. (2020). Facilitating student engagement through the flipped learning approach in K-12: A systematic review. *Computers & Education*, *151*, 1–36. https://doi.org/10.1016/j.compedu.2020.103819

Bryan, R. R., Glynn, S. M., & Kittleson, J. M. (2011). Motivation, achievement,

and advanced placement intent of high school students learning science. *Science Education*, *95*(6), 1049–1065. https://doi.org/10.1002/sce.20462

Caggy, R. C. da S. S., & Fischer, T. M. D. (2014). Interdisciplinarity revisited: Analyzing interdisciplinary practice in one of Bahia's management schools. *Administração: Ensino e Pesquisa*, *15*(3), Article 3. https://doi.org/10.13058/raep.2014.v15n3.12

Chao, C.-Y., Chen, Y.-T., & Chuang, K.-Y. (2015). Exploring students' learning attitude and achievement in flipped learning supported computer aided design curriculum: A study in high school engineering education. *Computer Applications in Engineering Education*, *23*(4), 514–526. https://doi.org/10.1002/cae.21622

Chaqmaqchee, Z. A. I. (2021). Flipped teaching a trend for students learning in higher education. *Koya University Journal of Humanities and Social Sciences (KUJHSS)*, *4*(6), 144–150. https://doi.org/10.14500/kujhss.v4n1y2021.pp144-150

Chin, C., & Osborne, J. (2008). Students' questions: A potential resource for teaching and learning science. *Studies in Science Education*, *44*(1), 1–39. https://doi.org/10.1080/03057260701828101

Coleman, H. V., Dickerson, J., & Dotterer, D. (2017). Critical thinking, instruction, and professional development for schools in the digital age. In *educational leadership and administration: concepts, methodologies, tools, and applications* (pp. 1774–1793). IGI Global. https://doi.org/10.4018/978-1-5225-1624-8.ch081

Creswell, J. W. (2014). *Research design: Qualitative, quantitative and mixed methods approaches* (4th edition). SAGE Publications, Inc.

Crişan, G. I., & Albulescu, I. (2018). Developing artistic and plastic arts skills in school-age children through flipped classroom. *European Proceedings of Social and Behavioural Sciences*, *Education, Reflection, Development – ERD 2017*, 133–142. https://doi.org/10.15405/epsbs.2018.06.16

Cuervo, L. (2018). Study of an interdisciplinary didactic model in a secondary education music class. *Music Education Research*, *20*(4), 463–479. https://doi.org/10.1080/14613808.2018.1433148

Cussler, E. L. (2015). The future of the lecture. *AICHE Journal*, *61*(5), 1472–1477. https://doi.org/10.1002/aic.14807

Day, L. J. (2018). A gross anatomy flipped classroom effects performance, retention, and higher-level thinking in lower performing students. *Anatomical Sciences Education*, *11*(6), 565–574. https://doi.org/10.1002/ase.1772

Eğmir, E., & Ocak, G. (2016). Developing an achievement test towards evaluating critical thinking skill. *Journal of Turkish Studies*, *11*(19), 337–

360. https://doi.org/10.7827/TurkishStudies.9961

Enfield, J. (2013). Looking at the impact of the flipped classroom model of instruction on undergraduate multimedia students at CSUN. *TechTrends*, *57*(6), 14–27. https://doi.org/10.1007/s11528-013-0698-1

Erkuzu, D., & Çoban, A. (2018). Türk eğitim sisteminde görsel sanatlar dersi öğretim programlarının değerlendirilmesi [Evaluation of visual arts curriculum in Turkish education system]. *The Journal of Social Sciences*, *5*(25), 275–294. https://doi.org/10.16990/SOBIDER.4284

Ernawati, E., Alonemarera, A. S., & Sari, T. M. (2022). The critical thinking skills and independent learning analysis: The flipped classroom based on blended learning. *JPBIO (Jurnal Pendidikan Biologi)*, *7*(2), Article 2. https://doi.org/10.31932/jpbio.v7i2.1903

Fadli, M. R., Rochmat, S., Sudrajat, A., Aman, Rohman, A., & Kuswono. (2022). Flipped classroom in history learning to improve students' critical thinking. *International Journal of Evaluation and Research in Education (IJERE)*, *11*(3), Article 3. https://doi.org/10.11591/ijere.v11i3.22785

Fulgueras, M. J., & Bautista, J. (2020). Flipped classroom: Its effects on ESL learners' critical thinking and reading comprehension levels. *International Journal of Language and Literary Studies*, *2*(3), Article 3. https://doi.org/10.36892/ijlls.v2i3.228

Giuliano, C. A., & Moser, L. R. (2016). Evaluation of a flipped drug literature evaluation course. *American Journal of Pharmaceutical Education*, *80*(4), 1–8. https://doi.org/10.5688/ajpe80466

Goldsmith, L. T., Hetland, L., Hoyle, C., & Winner, E. (2016). Visual-spatial thinking in geometry and the visual arts. *Psychology of Aesthetics, Creativity, and the Arts*, *10*(1), 56–71. https://doi.org/10.1037/aca0000027

Gorman, A. L. (2020). Flipping the class promotes second medical student pharmacology learning in an integrated curriculum [Supplemental Issue: Experimental Biology 2020 Meeting Abstracts]. *The FASEB Journal*, *34*(1), 1–1. https://doi.org/10.1096/fasebj.2020.34.s1.03684

Gouseti, A. (2014). Digital technologies in education: New tools for new times? In A. Gouseti (Ed.), *Digital technologies for school collaboration* (pp. 27–57). Palgrave Macmillan US. https://doi.org/10.1057/9781137372857_2

Gu, M., & Sok, S. (2021). Factors affecting the academic achievement of nursing college students in a flipped learning simulation practice. *International Journal of Environmental Research and Public Health*, *18*(11), Article 11. https://doi.org/10.3390/ijerph18115970

Haddad, M., & Tylee, A. (2013). The development and first Uuse of the QUEST measures to evaluate school nurses' knowledge and skills for depression recognition and management. *Journal of School Health*, *83*(1), 36–44.

https://doi.org/10.1111/j.1746-1561.2012.00745.x

Halasa, S., Abusalim, N., Rayyan, M., Constantino, R. E., Nassar, O., Amre, H., Sharab, M., & Qadri, I. (2020). Comparing student achievement in traditional learning with a combination of blended and flipped learning. *Nursing Open*, *7*(4), 1129–1138. https://doi.org/10.1002/nop2.492

Hao, Y. (2016). Exploring undergraduates' perspectives and flipped learning readiness in their flipped classrooms. *Computers in Human Behavior*, *59*, 82–92. https://doi.org/10.1016/j.chb.2016.01.032

Hosseini, E., Khodaei, F. B., Sarfallah, S., & Dolatabadi, H. R. (2012). Exploring the relationship between critical thinking, reading comprehension and reading strategies of English University students. *World Applied Sciences Journal*, *17*(10), 1356–1364.

Hsia, L.-H., Lin, Y.-N., & Hwang, G.-J. (2021). A creative problem solving-based flipped learning strategy for promoting students' performing creativity, skills and tendencies of creative thinking and collaboration. *British Journal of Educational Technology*, *52*(4), 1771–1787. https://doi.org/10.1111/bjet.13073

Hwang, G.-J., Chang, S.-C., Song, Y., & Hsieh, M.-C. (2021). Powering up flipped learning: An online learning environment with a concept map-guided problem-posing strategy. *Journal of Computer Assisted Learning*, *37*(2), 429–445. https://doi.org/10.1111/jcal.12499

Hwang, G.-J., Lai, C.-L., & Wang, S.-Y. (2015). Seamless flipped learning: A mobile technology-enhanced flipped classroom with effective learning strategies. *Journal of Computers in Education*, *2*(4), 449–473. https://doi.org/10.1007/s40692-015-0043-0

Idol, L., & Jones, B. F. (2013). *Educational Values and Cognitive Instruction: Implications for Reform*. Routledge.

İşçi, T. G., & Yazıcı, K. (2023). The effect of the use of the flipped learning model in the social studies course on the students' academic success and higher-order thinking skills. *International E-Journal of Educational Studies*, *7*(13), Article 13. https://doi.org/10.31458/iejes.1216865

Ismail, N. S., Harun, J., Zakaria, M. A. Z. M., & Salleh, S. Md. (2018). The effect of mobile problem-based learning application DicScience PBL on students' critical thinking. *Thinking Skills and Creativity*, *28*, 177–195. https://doi.org/10.1016/j.tsc.2018.04.002

Iwaniec, M., Simmonds, T., & Swan, Z. (2017). A practical case study exploring how flipped learning affects the development of problem solving skills in two different disciplines. *Compass: Journal of Learning and Teaching*, *10*(1), Article 1. https://doi.org/10.21100/compass.v10i1.426

Jamaludin, R., & Osman, S. Z. (2014). The use of a flipped classroom to enhance engagement and promote active learning. *Journal of Education and*

Practice, *5*(2), 124–131.

Jdaitawi, M. (2019). The effect of flipped classroom strategy on students learning outcomes. *International Journal of Instruction*, *12*(3), 665–680. https://doi.org/10.29333/iji.2019.12340a

Ji, D., Yang, X., & Wang, W. (2022). Evaluating the design and teaching effect of college mobile English learning using deep learning technique. *Wireless Communications and Mobile Computing*, *2022*, Article 2797854. https://doi.org/10.1155/2022/2797854

Karaca, C., & Ocak, M. A. (2017). Effects of flipped learning on university students' academic achievement in algorithms and programming education. *International Online Journal of Educational Sciences*, *9*(2), 527–543. https://doi.org/10.15345/IOJES.2017.02.017

Karyadi, P. A., Paristiowati, M., & Afrizal. (2020). Analysis the 21st century skills of students in chemical equilibrium learning with flipped classroom-collaborative problem solving model. *JTK (Jurnal Tadris Kimiya)*, *5*(1), Article 1. https://doi.org/10.15575/jtk.v5i1.7971

Kim, J., Park, H., Jang, M., & Nam, H. (2017). Exploring flipped classroom effects on second language learners' cognitive processing. *Foreign Language Annals*, *50*(2), 260–284. https://doi.org/10.1111/flan.12260

Kılıç, A., Duman, E. D., & Ersoy, F. (2019). *Ortaöğretim görsel sanatlar dersi 10 öğretmen kılavuz kitabı [Secondary education visual arts course 10 teacher guidebook]* (1st ed.). Ministry of National Education Publications. https://gorselsanatlar.org/kilavuzlar/10_KILAVUZ.pdf

Kong, S. C. (2015). An experience of a three-year study on the development of critical thinking skills in flipped secondary classrooms with pedagogical and technological support. *Computers & Education*, *89*, 16–31. https://doi.org/10.1016/j.compedu.2015.08.017

Kozikoğlu, İ. (2019). Analysis of the studies concerning flipped learning model: A comparative meta-synthesis study. *International Journal of Instruction*, *12*(1), 851–868. https://doi.org/10.29333/iji.2019.12155a

Kwon, O. Y. (2021). Flipped learning: An alternative pedagogical approach in the untact age. *Journal of Exercise Rehabilitation*, *17*(4), 222–225. https://doi.org/10.12965/jer.2142296.148

Lai, E. R. (2011). *Critical thinking: A literature review* (p. 50) [Research Report]. Pearson.

Levy, D. A. (1997). *Tools of critical thinking: Metathoughts for psychology*. Allyn and Bacon.

Lin, M.-H., Chen, H.-C., & Liu, K.-S. (2017). A Study of the Effects of digital learning on learning motivation and learning outcome. *Eurasia Journal of Mathematics, Science and Technology Education*, *13*(7), 3553–3564. https://doi.org/10.12973/eurasia.2017.00744a

Linur, R., & Mubarak, M. R. (2022). Students' perceptions on using the flipped

classroom method to support their self-regulated learning in Arabic speaking skills: Exploratory Study. *Al-Ta'rib: Jurnal Ilmiah Program Studi Pendidikan Bahasa Arab IAIN Palangka Raya*, *10*(1), Article 1. https://doi.org/10.23971/altarib.v10i1.3812

Mas'ud, H., & Surjono, H. D. (2018). The implementation of flipped classroom learning model using Moodle to increase students' higher order thinking skills. *Journal of Educational Science and Technology (EST)*, *4*(3), 187–194. https://doi.org/10.26858/est.v1i1.6521

McNeill, K. L., & Pimentel, D. S. (2010). Scientific discourse in three urban classrooms: The role of the teacher in engaging high school students in argumentation. *Science Education*, *94*(2), 203–229. https://doi.org/10.1002/sce.20364

Megha, N., Bhawna, N., & Jagga, N. V. (2023). Flipped classroom learning approach in physiotherapy education-A journey towards digital era. *International Journal of Medical Science and Diagnosis Research*, *7*(3), 35–43. https://doi.org/10.32553/ijmsdr.v7i2.979

Milner-Bolotin, M., Egersdorfer, D., & Vinayagam, M. (2016). Investigating the effect of question-driven pedagogy on the development of physics teacher candidates' pedagogical content knowledge. *Physical Review Physics Education Research*, *12*(2), 1–16. https://doi.org/10.1103/PhysRevPhysEducRes.12.020128

Morris-Eyton, H., & Pretorius, E. (2023). Cultivating a digital promise: Promoting reflective and reflexive activities to enhance self-directed learning for the 21st century. *Student Success*, *14*(1), Article 1. https://doi.org/10.5204/ssj.2659

Mukhlisa, R., Gani, A., Winarni, S., Khaldun, I., & Hanum, L. (2021). Independence of learning and achievement of learners' cognitive abilities in thermochemical materials through the application of flipped classroom. *Jurnal Penelitian Pendidikan IPA*, *7*(4), Article 4. https://doi.org/10.29303/jppipa.v7i4.674

Munir, M. T., Baroutian, S., Young, B. R., & Carter, S. (2018). Flipped classroom with cooperative learning as a cornerstone. *Education for Chemical Engineers*, *23*, 25–33. https://doi.org/10.1016/j.ece.2018.05.001

Murray, D., Koziniec, T., & McGill, T. (2015). *Student perceptions of flipped learning*. *160*, 57–62. http://crpit.com/confpapers/CRPITV160Murray.pdf

Nederveld, A., & Berge, Z. L. (2015). Flipped learning in the workplace. *Journal of Workplace Learning*, *27*(2), 162–172. https://doi.org/10.1108/JWL-06-2014-0044

Nouri, J. (2016). The flipped classroom: For active, effective and increased learning – especially for low achievers. *International Journal of Educational Technology in Higher Education*, *13*(1), 13–33.

https://doi.org/10.1186/s41239-016-0032-z

Nugraheni, B. I., Surjono, H. D., & Aji, G. P. (2022). How can flipped classroom develop critical thinking skills? A literature review. *International Journal of Information and Education Technology*, *12*(1), 82–90. https://doi.org/10.18178/ijiet.2022.12.1.1590

Ocak, G., & Park, F. (2020). Developing analytical thinking scale for high school students. *Afyon Kocatepe University Journal of Social Sciences*, *22*(1), Article 1. https://doi.org/10.32709/akusosbil.565699

O'Connor, E. E., Fried, J., McNulty, N., Shah, P., Hogg, J. P., Lewis, P., Zeffiro, T., Agarwal, V., & Reddy, S. (2016). Flipping radiology education right side up. *Academic Radiology*, *23*(7), 810–822. https://doi.org/10.1016/j.acra.2016.02.011

Pang, Y. (2022). The role of web-based flipped learning in EFL learners' critical thinking and learner engagement. *Frontiers in Psychology*, *13*, 1–12.

Pardosi, A. S., & Ming, L. Y. (2022). Flipping the classroom to promote higher order thinking skill: A case of Chinese undergraduate students. *Journal of Educational Management and Instruction*, *1*(2), 62–70.

Park, E. O., & Park, J. H. (2018). Quasi-experimental study on the effectiveness of a flipped classroom for teaching adult health nursing. *Japan Journal of Nursing Science: JJNS*, *15*(2), 125–134. https://doi.org/10.1111/jjns.12176

Paryani, S., & Ramadan-Jradi, R. (2019). The impact of flipped learning on student performance and engagement: A systematic literature review. *International Journal of Learning and Teaching*, *5*(1), 30–37. https://doi.org/10.18178/ijlt.5.1.30-37

Petillion, R. J., & McNeil, W. S. (2020). Johnstone's triangle as a pedagogical framework for flipped-class instructional videos in introductory chemistry. *Journal of Chemical Education*, *97*(6), 1536–1542. https://doi.org/10.1021/acs.jchemed.9b01105

Phurikultong, N., & Kantathanawat, T. (2022). Flipping the undergraduate classroom to develop student analytical thinking skills. *Emerging Science Journal*, *6*(4), 739–757. https://doi.org/10.28991/ESJ-2022-06-04-06

Priyaadharshini, M., & Vinayaga Sundaram, B. (2018). Evaluation of higher-order thinking skills using learning style in an undergraduate engineering in flipped classroom. *Computer Applications in Engineering Education*, *26*(6), 2237–2254. https://doi.org/10.1002/cae.22035

Ravandpour, A. (2022). The relationship between EFL learners' flipped learning readiness and their learning engagement, critical thinking, and autonomy: A structural equation modelling approach. *Journal of Language and Education*, *8*(3), Article 3. https://doi.org/10.17323/jle.2022.12654

Rehman, A., Pervaiz, A., & Shahzad, A. (2022). The role of flipped language

learning in developing the higher order thinking skills among the university students in Pakistan. *Pakistan Languages and Humanities Review*, *6*(4), Article 4. https://doi.org/10.47205/plhr.2022(6-IV)38

Reid, S. A. (2016). A flipped classroom redesign in general chemistry. *Chemistry Education Research and Practice*, *17*(4), 914–922. https://doi.org/10.1039/C6RP00129G

Richards, A. G., Tietyen, A. C., Jicha, G. A., Bardach, S. H., Schmitt, F. A., Fardo, D. W., Kryscio, R. J., & Abner, E. L. (2019). Visual Arts Education improves self-esteem for persons with dementia and reduces caregiver burden: A randomized controlled trial. *Dementia*, *18*(7–8), 3130–3142. https://doi.org/10.1177/1471301218769071

Roca, J., Reguant, M., & Canet, O. (2016). Learning outcomes of "The oncology patient" study among nursing students: A comparison of teaching strategies. *Nurse Education Today*, *46*, 29–35. https://doi.org/10.1016/j.nedt.2016.08.018

Sahin Dogruer, S. (2023). At school or home? Eight graders' first practices with online geometry lessons. *Turkish Online Journal of Distance Education*, *24*(1), Article 1. https://doi.org/10.17718/tojde.953261

Sajid, M. R., Laheji, A. F., Abothenain, F., Salam, Y., AlJayar, D., & Obeidat, A. (2016). Can blended learning and the flipped classroom improve student learning and satisfaction in Saudi Arabia? *International Journal of Medical Education*, *7*, 281–285. https://doi.org/10.5116/ijme.57a7.83d4

Seitan, W. I., Ajlouni, A. O., & Al-Shara'h, N. D. A. (2020). The impact of integrating flipped learning and information and communication technology on the secondary school students' academic achievement and their attitudes towards it. *International Education Studies*, *13*(2), Article 2. https://doi.org/10.5539/ies.v13n2p1

Shyr, W.-J., & Chen, C.-H. (2018). Designing a technology-enhanced flipped learning system to facilitate students' self-regulation and performance. *Journal of Computer Assisted Learning*, *34*(1), 53–62. https://doi.org/10.1111/jcal.12213

Smith, T. E., Rama, P. S., & Helms, J. R. (2018). Teaching critical thinking in a GE class: A flipped model. *Thinking Skills and Creativity*, *28*, 73–83. https://doi.org/10.1016/j.tsc.2018.02.010

Sternberg, R. J. (2006). The Rainbow Project: Enhancing the SAT through assessments of analytical, practical, and creative skills. *Intelligence*, *34*(4), 321–350. https://doi.org/10.1016/j.intell.2006.01.002

Styers, M. L., Van Zandt, P. A., & Hayden, K. L. (2018). Active learning in flipped life science courses promotes development of critical thinking skills. *CBE—Life Sciences Education*, *17*(3), 1–13. https://doi.org/10.1187/cbe.16-11-0332

Sun, J. C.-Y., & Wu, Y.-T. (2016). Analysis of learning achievement and teacher–

student interactions in flipped and conventional classrooms. *The International Review of Research in Open and Distributed Learning*, *17*(1), 79–99. https://doi.org/10.19173/irrodl.v17i1.2116

Suprapti, S., Nugroho, A., & Pembangunan, H. R. P. (2021). Flipped learning instruction to enhance university students' higher order thinking skills. *Jurnal Kependidikan: Jurnal Hasil Penelitian Dan Kajian Kepustakaan Di Bidang Pendidikan, Pengajaran Dan Pembelajaran*, *7*(2), 261–269. https://doi.org/10.33394/jk.v7i2.3320

Techanamurthy, U., Alias, N., & Dewitt, D. (2020). A problem-solving flipped classroom module: Developing problem-solving skills among culinary arts students. *Journal of Technical Education and Training*, *12*(4), Article 4.

Tsytovich, M. V., & Boronenko, G. F. (2018). Teaching academic writing in a flipped classroom. *Bulletin of the South Ural State University Series "Education. Educational Science,"* *10*(2), 59–65. https://doi.org/10.14529/ped180208

Tung, K. Y. & Alissa. (2021). Flipperentiated learning in biology class to improve cognitive learning outcomes, problem-solving skill, and motivation. *International Journal of Education and Literacy Studies*, *9*(1), 183–190.

Türkkan, B. (2011). Görsel sanatlar öğretim, dersindeki uygulamaların meslek yaşamında kullanılabilirliğine ilişkin sınıf öğretmeni adaylarının görüşleri [Elementary school teacher candidates' views about the usability of visual arts teaching applications in professional life]. *Education Sciences*, *6*(1), 91–105.

Vidergor, H. E. (2018). Effectiveness of the multidimensional curriculum model in developing higher-order thinking skills in elementary and secondary students. *The Curriculum Journal*, *29*(1), 95–115. https://doi.org/10.1080/09585176.2017.1318771

Waltz, C. F. (2005). *Measurement in nursing and health research*. Springer Publishing Company.

Wang, F. H. (2017). An exploration of online behaviour engagement and achievement in flipped classroom supported by learning management system. *Computers & Education*, *114*, 79–91. https://doi.org/10.1016/j.compedu.2017.06.012

Wang, S., & Seepho, S. (2017). Facilitating Chinese EFL learners' critical thinking skills: The contributions of teaching strategies. *SAGE Open*, *7*(3), 1–9. https://doi.org/10.1177/2158244017734024

Wang, V., & Hitch, L. (2017). Is active learning via Internet technologies possible? *International Journal of Online Pedagogy and Course Design (IJOPCD)*, *7*(2), 48–59. https://doi.org/10.4018/IJOPCD.2017040104

Westhuizen, C. P. V. D., & Rautenbach, E. M. (1997). The teaching of higher-order thinking skills to gifted pupils at the elementary level. *Early Child Development and Care*, *130*(1), 1–12.

https://doi.org/10.1080/0300443971300101

Winner, E. (2007). Visual thinking in arts education: Homage to Rudolf Arnheim. *Psychology of Aesthetics, Creativity, and the Arts*, *1*(1), 25–31. https://doi.org/10.1037/1931-3896.1.1.25

Xu, Z., & Shi, Y. (2018). Application of constructivist theory in flipped classroom—Take college English teaching as a case study. *Theory and Practice in Language Studies*, *8*(7), 880–887. https://doi.org/10.17507/tpls.0807.21

Yulian, R. (2021). The flipped classroom: Improving critical thinking for critical reading of EFL learners in higher education. *Studies in English Language and Education*, *8*(2), Article 2. https://doi.org/10.24815/siele.v8i2.18366

Zhou, X. (2023). A conceptual review of the effectiveness of flipped learning in vocational learners' cognitive skills and emotional states. *Frontiers in Psychology*, *13*, 1–10. https://doi.org/10.3389/fpsyg.2022.1039025