

## Enhancing artistic expression through installation art: A training program based on the experimental dialectical approach



Hussein Ahmed Shahat\*, Noura Samir Hamad Al-Naim

Faculty of Education, King Faisal University, Al-Ahsa, Saudi Arabia

### ARTICLE INFO

#### Article history:

Received 29 May 2024

Received in revised form

28 September 2024

Accepted 26 October 2024

#### Keywords:

Artistic expression skills

Experimental dialectical approach

Synthetic art

Quasi-experimental method

Installation art

### ABSTRACT

This study aims to assess the effectiveness of an experimental dialectical approach in improving artistic expression skills and to examine the relationship between using synthetic art and the development of these skills with materials and media. To do this, a quasi-experimental method was used. The study involved 80 female second-year middle school students from Al-Ahsa Governorate, divided into two groups: an experimental group and a control group, each with 40 students. A scale measuring artistic expression skills was used to evaluate their performance. Researchers were trained through a specific program. The results showed significant differences between the experimental group and the control group in the use of materials and media, with the experimental group performing better in the post-test. Additionally, there was a positive correlation between the use of installation art and the development of artistic expression skills related to materials and media in the experimental group after the intervention. Based on these findings, further studies on fine arts and their impact on developing artistic expression skills in students at different educational levels are recommended.

© 2024 The Authors. Published by IASE. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

### 1. Introduction

The experimental dialectical approach allows students to experience creating knowledge through effective action (Hake, 2012). Practical experience provides for careful observation. Carini et al. (2006) and Darmawansah et al. (2024) showed that dialectical debates provide students with value, putting them in charge of their own learning and improving their thinking and problem-solving abilities. Moreover, Leonido (2023) confirmed that training plans and methodologies may help establish an educational atmosphere that promotes the development of artistic expression abilities. Eisner (2003) pointed out that artistic expression requires skills such as observation, mastery, practice, experimentation, creativity, and imitation. These skills aid students in artistic expression, enhancing clarity, sincerity, choice of elements and shapes, and building relationships, resulting in artistic and expressive value. Artistic expression is crucial to

achieving the goal of holistic education, as students learn how different cultures have expressed themselves throughout history, thus increasing their knowledge of the world. Installation art is among these artistic trends and is based on transforming non-artistic objects by researching and experimenting with raw materials to create works of art based on assembly principles. Modes of participation that can build artistic expression and plastic skills to link theory to practice should not be ignored. Training programs increase opportunities for understanding and encourage the trainee to investigate the relationships that arise between the artistic work's elements and discuss the methods that organize them. The teacher can formulate many concepts that achieve the goals of the educational process through art. This is not limited to knowledge but extends beyond it to include experience, expression, and the value inherent in art.

Teachers use various techniques based on learners' needs. Teaching theories are divided into teacher-centered and student-centered approaches. A teaching technique comprises defined procedures for specific tasks (Goodwin, 2024). Therefore, choosing the appropriate teaching approach is crucial, as it is an entry point for developing students' artistic expression skills and encouraging them to think critically and solve problems. The experimental dialectical and the Scout approach are

\* Corresponding Author.

Email Address: [h.ali@kfu.edu.sa](mailto:h.ali@kfu.edu.sa) (H. A. Shahat)

<https://doi.org/10.21833/ijaas.2024.11.009>

Corresponding author's ORCID profile:

<https://orcid.org/0000-0001-9650-6417>

2313-626X/© 2024 The Authors. Published by IASE.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

among these approaches. Learning in the experimental dialectical approach depends on practical performance and experimentation to gain knowledge and solve problems through observation. The experimental approach is an outstanding teaching method because it encourages creativity and enhances reflective thinking. Thus, Kolb's (2014) theory suggests there are four approaches to learning: concrete experience, reflective observation, abstract visualization, and active experimentation.

Many studies have called for clarifying the philosophical and aesthetic concepts of installation arts and employing the expressive dimensions of the material. For example, Henriksen et al. (2018) highlighted the need for educational programs to be tailored to students' readiness and experience levels, ensuring that new scientific techniques are introduced appropriately. This approach advocates for a personalized learning experience, where students engage with content that aligns with their current capabilities and progressively builds their expertise. In addition, Ho et al. (2017) posited that the continuous development of modern technologies and applications would lead to the development and enrichment of artistic expression skills.

Therefore, the present study aims to verify the effectiveness of the experimental dialectical approach in developing artistic expression skills related to the use of materials and media. In addition, the extent to which installation art is related to developing artistic expression skills is evaluated. The participating students are allowed to practice experimental thought by clarifying some aspects of media and materials. This study also sheds light on the experimental dialectical approach to developing artistic expression skills, explaining the relationship between installation art and artistic expression skills.

Several studies have called for the necessity of conducting research based on dialectical thinking. For instance, Veraksa et al. (2022) explored the role of dialectical thinking in psychological research, advocating for its integration to address complex psychological phenomena. Laske (2023) discussed the application of dialectical thinking in cognitive research and practice, highlighting its potential to enhance understanding in various fields. In addition, Chiu and Hwang (2024) emphasized the necessity of experimental approaches to enrich students' artistic expression skills. According to Eisner (2003), the curriculum should incorporate strategies for developing artistic skills and values, including problem-solving, research, and projects, promoting exploration, experimentation, and creative thought in installation art. This perspective is supported by Freedman (2000) and Atkinson (2017), who emphasized the significance of fostering creativity, experimental thinking, and hands-on projects in art education to nurture comprehensive artistic development.

The vision of the Saudi focuses on practical skills, considering the rapid cognitive and technical changes that today's generation is experiencing. This

vision is compatible with the Evaluation and Training Authority and is in line with the objectives of the artistic education curriculum. Some of the objectives include enriching students' experiences and expressive and plastic skills in artistic education and modern arts, as well as addressing artistic concepts through diverse activities, including the use of materials while considering students' abilities and their physical, mental, and emotional development. Thus, researchers visited schools to assess students' artistic expression skills related to expressive materials and media use. The researchers identified a deficiency among female students in specific skills, which led to the development of a training program aimed at enhancing these abilities. The research problem was formulated through the following questions:

1. What is the effectiveness of the experimental dialectical approach in developing artistic expression skills related to the use of materials and media among the participating students?
2. Is there a correlation between the use of installation art and the development of artistic expression skills concerning the materials and media available to the participating students?

The research hypothesis proposed that significant differences would exist between the average scores of female students in the experimental group and those in the control group regarding artistic expression skills related to the use of materials and media, with the experimental group expected to show improvement in the post-measurement. Additionally, the hypothesis questioned whether there would be a difference in the average scores between the experimental group using the dialectical approach and the control group employing traditional methods during the post-measurement phase.

## 2. Literature review

### 2.1. Artistic expression skills

Nimkulrat (2009) defined artistic expression as the messages and contents that the audience receives through the materiality of the work that generates a visual image based on concepts related to the materiality of the artistic medium. This, in turn, affects the nature of the cognitive power of the media, which is associated with secondary cognition and is influenced by verbal language and conception. According to Eisner (2003), artistic expression skills include observation, imitation, practice, mastery, creativity, and experimentation; each of them has sub-skills closely related to installation art.

Observation skills: The observation skills depend on transferring an experience or idea from one individual to another through a model of imitation and simulation. Thus, learners must reflect on their activities and see others performing those actions (Kolb, 2014).

**Simulation skills:** Simulation skills give students the possibility of mastering a new ability through practice in an imaginary situation. These skills enrich the knowledge needed to deal with future situations and enhance self-confidence (Alrashidi et al., 2023).

**Practice skills:** "Synthesis" refers to the use of various materials. Many concepts, like collage, assemblage art, and other modern art phrases, relate to synthesis regarding meaning, notwithstanding differences in interpretation (Arbex-Enrico, 2023). There are three types of synthesis: those based on the idea, the material, and performance techniques.

**Idea:** An idea is the ability to express the content using the expressive dimension of the material and multimedia and appropriate composition methods.

**Material:** Here, "material" is defined as the primary material that exists in its natural state before processing. It is also considered the basic material from which the product is manufactured.

**Performance techniques:** With the multiplicity of media and plastic tools, the artist can freely practice artistic expression through experimental practice with materials. The expression does not lie in the material elements but represents the immaterial element between form and self. The performance techniques in artistic works comprise gluing, assembly, connection, and installation.

## 2.2. Experimentation

Leonardo da Vinci's works use experimental methods, fostering imagination and problem-solving, allowing artists to explore facts, remove obstacles, and develop effective solutions (Knutz and Markussen, 2014). Thus, we can conceptualize how voids are formed. Dewey believes that the conditions under which we have a meaningful experience are those in which we can perceive the content of things (Crippen, 2016). Attridge (2018) argued that experimentation is a systematic, planned process that helps artists explore the physical elements of their artwork, such as shape, color, size, and direction, to develop ideas and artistic sense. In addition, creativity, as experimentation in form and composition, does not lead to stereotypical works in plastic art (Widodo, 2020). According to Lehane (2020), experimentation offers learners a concrete experience, allowing them to reinterpret existing experiences, develop abstract perceptions, and apply their ideas through active experimentation.

**Creativity expressive media:** Installation art is a multidisciplinary art form that incorporates sculpture, performance art, drawing, theater, photography, and other disciplines, using written texts and other media to influence the viewer's senses and emphasize the content.

**Void formation and audience skills:** Void is a crucial element in installation art, requiring careful study and material suitability. Space offers interaction opportunities to the audience, enhancing the overall experience. The creative work environment is interconnected, as it enhances

knowledge and encourages individuals to reassess their understanding of art and the surrounding environment (Pelowski et al., 2018).

**Content:** Art is directly related to the ability to convey expressive messages; it expresses the artist's point of view on the social, moral, cultural, ethical, and religious issues of their time (Li, 2023).

## 2.3. Installation arts

Installation arts is a broad term applied to a group of artistic practices that includes the installation or composition of physical work elements in the void, where the sum of the objects and void constitutes the work of an artist (Ding and Guo, 2023). The word "installation" has now expanded to include any arrangement of objects in any given void to the point that it can be applied even to traditional devices (Bishop, 2005; Kühnapfel et al., 2023).

Orlova (2020) identified two types of installation art: one dynamically changeable through viewer interaction and the other changeable under specific environments, allowing the recipient to perceive and understand the artwork's overall impression. Manresa (2020) confirms that installation arts, according to the definition of the Oxford Dictionary, are restricted to two specific categories: assembly and installation art in the void. "Installations" are "works of art that link disparate types of objects and materials together," such as those produced by Rauschenberg (Fig. 1). They differ from the installation art created by Allan Kaprow, who defined them as non-sculptural works of art that not only occupy a certain space but also fill it with all kinds of objects and materials. Moreover, environments include another key element: the viewer (Fig. 2).



Fig. 1: "Canyon" by artist Rauschenberg



Fig. 2: Words by artist Allan Kaprow

Considering what has been presented, a distinction can be made between artworks that rely on assembly and those that rely on installation art. Both rely on a combination of materials, but the latter includes electronic media, film, sound, and

light in their composition (Zhuo et al., 2023). Thus, the relationship between artistic expression skills and the structural foundations of installation art can be established (Fig 3).

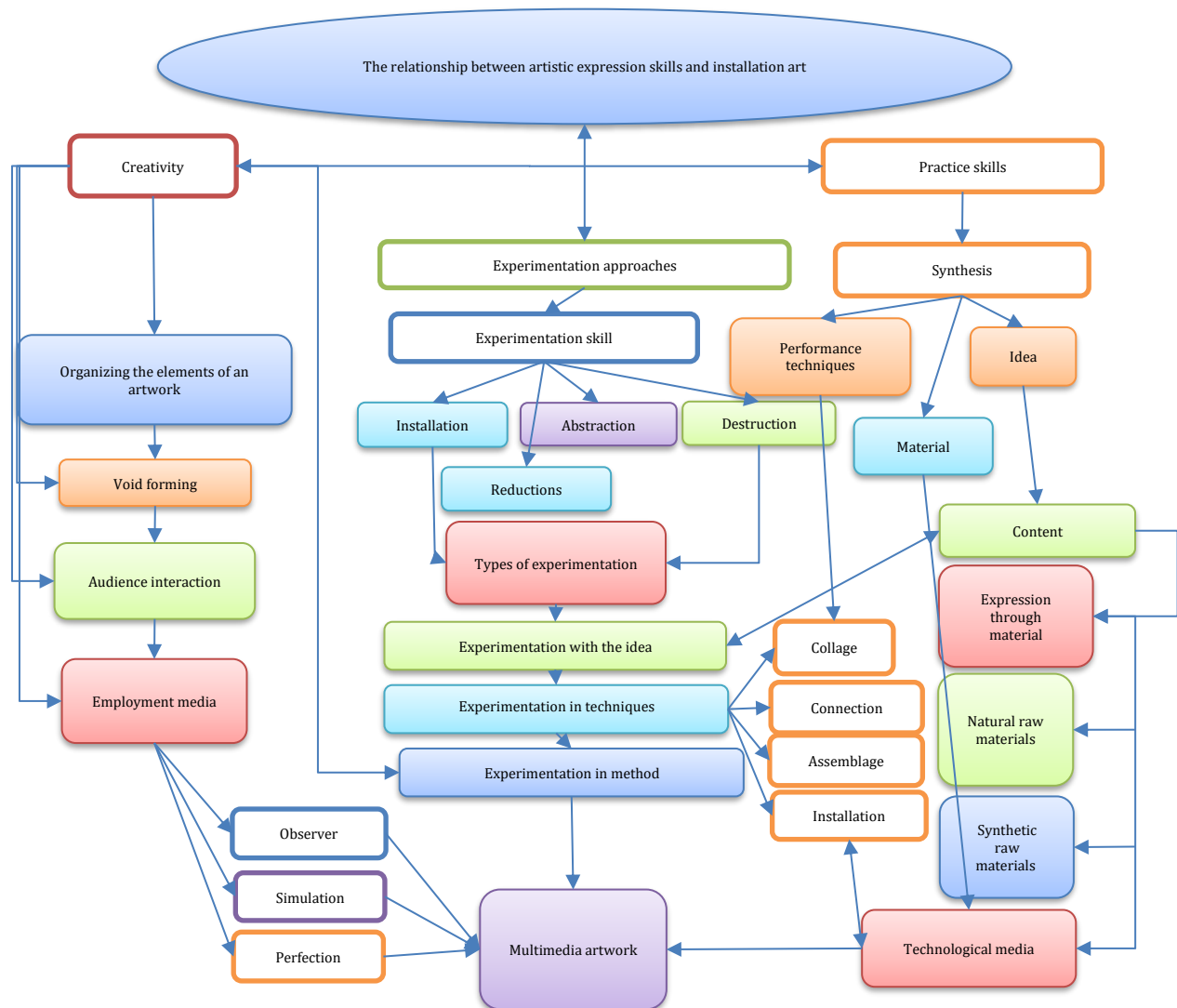


Fig. 3: An illustration of artistic expression skills and installation art related to the use of materials and media

The relationship between artistic expression skills and installation art depends on three overlapping paths linked to each other.

**Practice skills:** The methods of forming and using materials and expressive media are linked to the synthetic methods of the material (assembly, gluing, and installation). Practice skills are also linked to three other elements, namely, the idea of the artistic work, the characteristics of the material and the medium, the technical performance, and the material-forming methods. These elements are critical in achieving artistic unity and its expressive dimensions. Therefore, they are linked to the second path, experimentation.

**Experimentation skills:** Experimentation is a basic and acquired ability. There are several types of experimentation. Experimenting may be defined as arranging and formulating the elements of a complex artistic work. This requires overlapping intellectual processes, which allow for deletion and addition

without specific steps. In addition, students experiment with procedures to illustrate elements and shapes during the implementation of an installation artwork.

**Technique experimenting:** More than one technique is mixed in a single artistic work to experiment with the processing of a particular material. This enables the students to benefit from the plastic and expressive potential of the material.

Experimentation stimulates the tendency to discover plastic relationships. It also helps in careful observation and finding design formulations for kinetic arrangements between shapes and spaces involving exchange, assembly, rotation, reflexive organization, deletion, and addition. Moreover, experimentation requires mastery and precision.

**Creativity skills:** Creativity is defined as producing something new and is characterized by originality, flexibility, and fluency. Installation art is not just a new artistic formation, but it is also a



behavior that helps in the growth of thinking, creative performance, and plastic fluency by presenting the aesthetic aspects of the subject with different solutions, such as changing the form, moving it, reorganizing it, and arranging it in new ways that reflect unfamiliar plastic connotations and meanings. Thus, creativity encourages the audience to interact so that they can be part of the work or stimulate their senses using multimedia materials and technological media.

## 2.4. Teaching approaches

### 2.4.1. Experimental dialectical approach

According to Darmawansah et al. (2024), the experimental dialectical approach involves asking thought-provoking questions, engaging in purposeful dialogue, and conducting simple experiments to identify correct facts and concepts. This approach encourages students to abandon incorrect ideas in a fun environment and apply their findings in real-life situations. Liu and Matthews (2005) affirmed that

this strategy is centered on the learner's action and relies on practical experimentation as well as disagreement, discourse, and discussion. Thus, this approach is consistent with the principles of constructivist philosophy. The dialectical approach involves cooperative learning, research, experimentation, testing ideas, active participation, and stimulating thinking.

Kolb's (2014) theory proposes four routes to learning: concrete experience, reflective observation, abstract visualization, and active experimentation. The experimental approach is an excellent teaching strategy because it promotes creativity and reflective thinking. The experimental approach is effective for achieving active and comprehensive learning (Samaniego et al., 2024). Because it combines theory and practical application to improve understanding and skill development, build concepts, enhance problem-solving abilities, consolidate information, develop critical and analytical thinking skills, and understand the foundations of work to achieve artistic expression (Fig. 4).

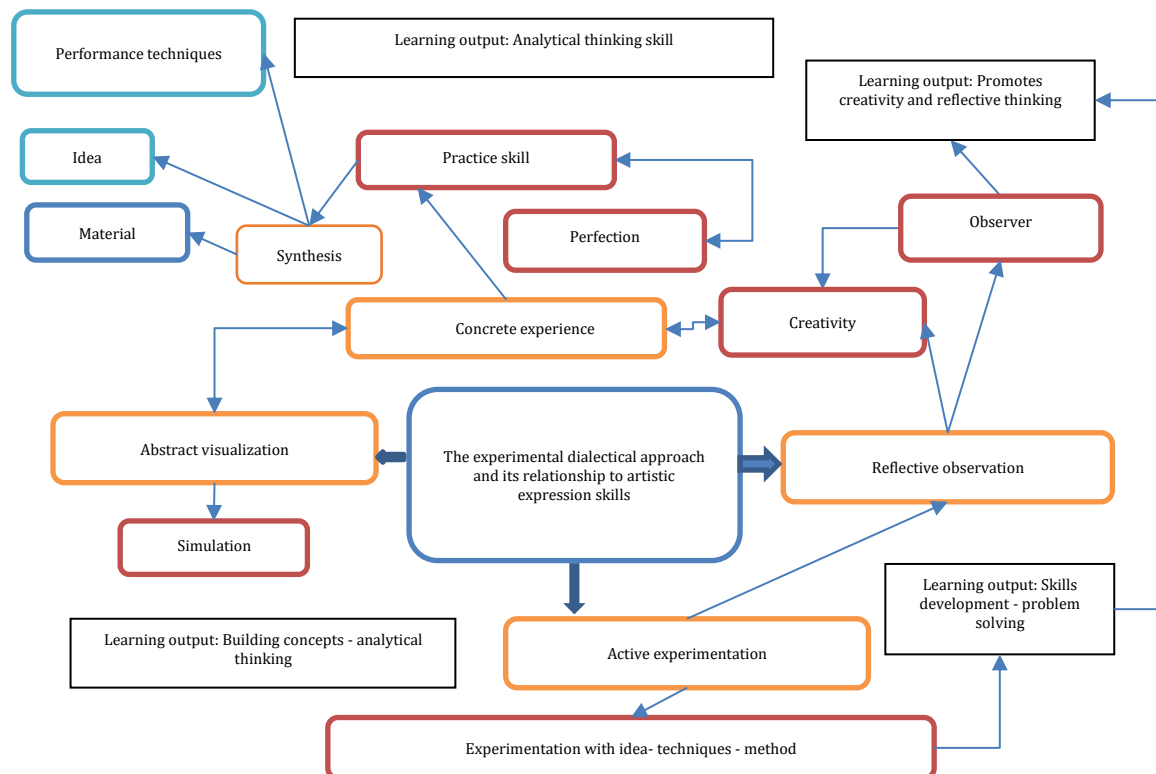


Fig. 4: The experimental dialectical approach and its relationship to artistic expression skills and learning output

## 3. Methodology

The current study employs a quasi-experimental design to examine the impact of the experimental dialectical approach (independent variable) on developing artistic expression skills related to the use of materials and media (dependent variable) among female second-year middle school students (study sample). Additionally, the research evaluates the relationship between compositional art and artistic expression skills. The experimental and control groups each consisted of 40 female students,

totaling 80 participants, all of whom attended private schools in Al-Ahsa. At the time of the study, there were 201 female students enrolled in private education in this city.

### 3.1. The scale of artistic expression skills

The study by Savluk et al. (2021) served as the foundation for developing a measure of artistic expression skills related to the use of materials and media. This measure aimed to assess the artistic expression skills of participating students based on

the principles of installation art. The scale includes three factors measured by 15 statements on a five-point Likert scale (where "always applies" = 5, "often applies" = 4, "sometimes applies" = 3, "rarely applies" = 2, and "never applies" = 1). The total score ranges from 15 to 75, with 75 as the highest score, 45 as the average, and 15 as the lowest score. Scores above the average suggest that students possess good artistic expression skills, while scores below indicate a lack of these skills. To validate the scale, internal consistency was assessed, yielding correlation coefficients between 0.521 and 0.776. The reliability was confirmed using Cronbach's alpha coefficient, which was 0.702.

### 3.2. Training program

A training program was designed using the experimental dialectical approach to enhance artistic expression skills related to materials and media by applying the structural principles of installation art. The program aimed to evaluate the effectiveness of this approach in improving artistic expression skills, offering opportunities to experiment with different materials, and selecting appropriate techniques for expressing ideas. Additionally, ideas were adapted, and compatible media (such as light and sound) were used in line with the content of the artwork. The experimental dialectical approach was implemented through a series of interconnected steps that allowed learners to revisit and progress through previous stages:

1. Preparing students and defining activities: This stage involves asking questions to stimulate students' thinking and imagination, guiding them to create artistic works through activities and experiments based on the principles of synthetic art. It also covers the processes of synthesis and installation using multimedia. Videos and examples of artistic works are employed as educational tools to explain the foundations of art.

2. Engaging in production processes while developing a vision for the artwork's structure and implementation: During this stage, a dialectical dialogue with peers is encouraged to discuss the structure of the artwork and the use and synthesis of multimedia in accordance with the structural principles of installation art.
3. Asking questions and evaluating experiences: At this stage, students identify and address the difficulties and obstacles they encounter during the implementation process. They work on overcoming these challenges and develop suitable solutions for the structure of their artistic work.
4. Conducting dialectical dialogue at each stage: Throughout the process, the teacher engages in dialogue with the students to clarify unclear concepts, explain techniques for using media and materials, and explore experimental approaches for the structure of installation art. Students are also encouraged to undertake additional activities.
5. Evaluation of results\*\*: The final stage involves assessing the outcomes of the students' work.

Table 1 shows the stages and strategies for implementing the training program to develop artistic expression skills among middle school students.

### 4. Results and discussion

Data analysis was performed to verify the validity of the first research hypothesis: Are there significant differences between the average scores of female students in the experimental group and those in the control group on a scale of artistic expression skills related to the use of materials and media, in favor of the experimental group in the post-measurement?

The t-test was used to calculate the differences between the average scores of the experimental and control groups in the two post-measurements on the scale of artistic expression skills in artistic works (Table 2).

**Table 1:** Stages of training program implementation

Sessions	Program content	Teaching strategies and approaches
1-2	Introduction to the training program, its objectives and procedures, and concepts of installation and building art. Learn about the concept and skills of artistic expression and methods for using materials and media in artistic work. Experimental dialectical crowbar. Proposing a set of controversial concepts, such as artistic expression, installation art, and the nature of expressive media, to stimulate the students' mental processes.	Lecture and discussion
3-9	Explaining the principles of constructing and designing works of art. Providing the students with the opportunity to explore materials and their plastic capabilities. Training and conducting practical experiments according to the structural foundations of installation art. At every stage of the production process, viewpoints are presented on the structure of artistic works, discussing whether the idea is innovative, how the media and materials can be used according to the performance methods, and the plastic and expressive capabilities of the material. How does the audience interact with the artwork? What are the technological effects and media (video, sound, and light) that can be used? How can media be integrated into the structure of the artwork? Is the expressive content of the artwork achieved? What are the adequate approaches to experimentation and synthesis using the material according to the structural foundations of installation art? Controversial questions are asked to allow the students to devise expressive and plastic solutions according to the foundations of installation art.	Experimental dialectical approach Learning strategy project
10-11	Constructive evaluation	Formative evaluation
12	Final review and evaluation stage	Summative evaluation

**Table 2:** Results of t-tests of independent samples

Dimensions	Group	Mean	SD	T-value	P-value
Experimentation and practice	Control	13.55	1.09	-65.368	<0.001
	Experimental	31.63	1.37		
Creativity and simulation	Control	9.80	0.97	-32.762	<0.001
	Experimental	16.95	0.99		
Observation and mastery	Control	9.58	0.98	-42.672	<0.001
	Experimental	17.90	0.74		
Total	Control	32.93	1.64	-81.749	<0.001
	Experimental	66.48	2.01		

The t-value was -81.749, and the p-value was 0.001 (Table 2), indicating that there was a significant ( $p < 0.05$ ) difference between the averages of the experimental and control groups on the scale of artistic expression skills related to the use of materials and media. Moreover, the post-test favored the experimental group.

The data were also analyzed to verify the validity of the second research hypothesis: Is there a difference between the average scores of the experimental group (experimental dialectical approach) and the control group (traditional method) in the post-measurement? The t-test was

used to calculate the differences between the average scores of the two experimental groups in the pre- and post-measurements on the scale of artistic expression skills (Table 3). The t-value was -54.464, and the p-value was 0.001 (Table 3), indicating that there was a significant ( $p < 0.05$ ) difference between the average scores of the experimental group on the scale of artistic expression skills related to the use of materials and media, favoring the experimental group in the post-measurement period. This outcome demonstrates the effectiveness of the training program based on the experimental dialectical approach.

**Table 3:** Results of t-tests of paired samples

Dimensions	Pre-post-tests	Mean	SD	T-value	P-value
Experimentation and practice	Pre-test	14.90	1.89	-43.372	<0.001
	Post-test	31.63	1.37		
Creativity and simulation	Pre-test	9.03	1.35	-29.475	<0.001
	Post-test	16.95	0.98		
Observation and mastery	Pre-test	9.60	1.34	-31.781	<0.001
	Post-test	17.90	0.74		
Total	Pre-test	33.60	3.01	-54.464	<0.001
	Post-test	66.48	2.01		

The results revealed that the program helped second-year middle school students develop artistic expression skills. The dialectical approach allows for creating new opportunities by moving from one position to another using a thinking process, which provides opportunities to determine the relationships between the elements of the artistic work according to the foundations of installation art. The processes of exploration and experimentation in media and materials lead to exploring solutions. New plastic arts and technical treatments foster creativity. Observation processes also provide the opportunity to organize work elements. This allows students to achieve mastery through practices that enhance their expression skills. This is consistent with the results of Abu Zeid's (2023) study, which showed that appropriate teaching techniques helped improve student teachers' artistic education and artistic expression skills. Thus, student teachers must exhibit performance indicators rooted in a creative vision, including design, color, technology, emotion, photography, space, and creativity. Here, the participating students enhanced their organizational imaginations using the foundations of installation art, including the use of media, while considering the formal logic of the artistic work. Our results are consistent with Al-Sharif's (2023) study, which indicated that plastic practices and the synthesis of multimedia and technology work to enrich the imagination of female students. In addition, researchers believe that the philosophy of

installation art breaks the boundaries between the plastic art fields. This allowed the students to combine more than one style and method of dealing with the material in the structure of the artistic work to express their ideas in various ways. This outcome is consistent with the results of the study by Ali (2021), who applied the structural foundations of installation art to achieve a mosaic of expressive outputs in the students' works, with characteristics of installation art, using photographs, music, electronic media, and written texts. This is also consistent with the work of Reiss (2019). Observation skills played a role in raising the level of contemplation, mastery, and analysis of artistic products among the students, consistent with the findings of Savluk et al. (2021).

Therefore, both material and technique are critical in artistic expression, as the practitioners deal with the material through creativity, influenced by the experiences and skills acquired through exploration. Thus, the material has treatment levels related to the following:

- The direct perception of the material is linked to its formal, visual, and expressive concepts.
- Critical and constructive knowledge is linked to the characteristics and plastic capabilities of the material, the plastic solutions, the technical treatments, and the conceptual connotations of the elements that compose the structure of the artistic work.

## 5. Conclusions

There is a positive correlation between using the experimental dialectical method and providing opportunities to find connections between the elements of the artistic work (i.e., formal logic). There is also a positive correlation between the structural foundations of plastic art and the artistic expression skills associated with materials and media. Two paths apply the experimental dialectical approach in education: 1) Analyzing information and concepts, and 2) experimentation and technical practices related to materials and media and applying the foundations of installation art in designing and publishing complex work. Artistic expression skills lie in observation, imitation, experimentation, practice, innovation, and mastery. However, experimenting and performing are basic starting points for artistic creativity, whereas observation, imitation, and mastery are supportive factors that integrate with other expression skills.

Based on the results obtained in this study, we recommend the following:

- Paying attention to the philosophical frameworks of post-modern arts to develop the skills of students in art education.
- Conducting studies dealing with installation art and its relationship with the expressive dimensions of the material to develop the plastic and expressive skills of secondary school students.
- Performing studies that address the plastic values of the material and its impact on developing students' expressive skills.

## Acknowledgment

The authors gratefully appreciate the Deanship of Scientific Research at KFU in Saudi Arabia for their financial support and assistance in publishing the research (GRANT A157).

## Compliance with ethical standards

## Ethical considerations

Informed consent was secured, participation was voluntary, and data confidentiality was upheld throughout the study.

## Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## References

Abu Zeid R (2023). A proposed training program for teaching approaches based on artistic expression skills (for the student/teacher) in art education. *Journal of Fine Arts and Art Education*, 7(2): 435-469. [In Arabic] <https://doi.org/10.21608/jfea.2023.237337.1104>

- Ali G (2021). The concept in contemporary Saudi artistic formation in the style of installation art (an analytical study). *Journal of Arts, Literature, Humanities and Sociology*, 70: 180-186. [In Arabic] <https://doi.org/10.33193/JALHSS.70.2021.550>
- Alrashidi N, Pasay an E, Alrashedi MS, Alqarni AS, Gonzales F, Bassuni EM, Pangket P, Estadilla L, Benjamin LS, and Ahmed KE (2023). Effects of simulation in improving the self-confidence of student nurses in clinical practice: A systematic review. *BMC Medical Education*, 23: 815. <https://doi.org/10.1186/s12909-023-04793-1> PMID:37904153 PMCID:PMC10614341
- Al-Sharif S (2023). The impact of technological techniques and modern tools on the use of multiple materials in artistic work. *Research in Art Education and the Arts*, 23(1): 326-332. [In Arabic] <https://doi.org/10.21608/seaf.2023.283448>
- Arbex-Enrico M (2023). Collage as a creative act: Emergence, displacement, and re-signification. In: Bruhn J, Azcárate ALV, and de Paiva Vieira M (Eds.), *The Palgrave Handbook of Intermediality*. Palgrave Macmillan, Cham, Switzerland. [https://doi.org/10.1007/978-3-031-28322-2\\_37](https://doi.org/10.1007/978-3-031-28322-2_37)
- Atkinson D (2017). What is art education, what might it become? In: Jagodzinski j (Ed.), *What is art education? Education, psychoanalysis, and social transformation*. Palgrave Macmillan, New York, USA. [https://doi.org/10.1057/978-1-137-48127-6\\_7](https://doi.org/10.1057/978-1-137-48127-6_7) PMID:28567330 PMCID:PMC5440276
- Attridge D (2018). What do we mean by experimental art? *Angles: French Perspectives on the Anglophone World*. <https://doi.org/10.4000/angles.962>
- Bishop C (2005). *Installation art: A critical history*. Routledge, Oxfordshire, UK.
- Carini RM, Kuh GD, and Klein SP (2006). Student engagement and student learning: Testing the linkages. *Research in Higher Education*, 47: 1-32. <https://doi.org/10.1007/s11162-005-8150-9>
- Chiu MC and Hwang GJ (2024). Enhancing students' critical thinking and creative thinking: An integrated mind mapping and robot-based learning approach. *Education and Information Technologies*. <https://doi.org/10.1007/s10639-024-12752-6>
- Crippen M (2016). Dewey on arts, sciences and Greek philosophy. In: Veszelszki A and Benedek A (Eds.), *In the beginning was the image: The omnipresence of pictures: Time, truth, tradition (Visual learning)*: 153-159. Peter Lang, Lausanne, Switzerland.
- Darmawansah D, Hwang GJ, and Lin CJ (2024). Integrating dialectical constructivist scaffolding-based argumentation mapping to support students' dialectical thinking, oral and dialogical argumentation complexity. *Educational Technology Research and Development*. <https://doi.org/10.1007/s11423-024-10395-5>
- Ding W and Guo T (2023). Research on the application of interactive installation art in modern commercial space under the background of experience economy. In: Rauterberg M (Ed.), *Culture and Computing. HCII 2023. Lecture Notes in Computer Science*, 14035. Springer, Cham, Switzerland. [https://doi.org/10.1007/978-3-031-34732-0\\_8](https://doi.org/10.1007/978-3-031-34732-0_8)
- Eisner EW (2003). The arts and the creation of mind. *Language Arts*, 80(5): 340-344. <https://doi.org/10.58680/la2003322>
- Freedman K (2000). Social perspectives on art education in the US: Teaching visual culture in a democracy. *Studies in Art Education*, 41(4): 314-329. <https://doi.org/10.2307/1320676>
- Goodwin JR (2024). What's the difference? A comparison of student-centered teaching methods. *Education Sciences*, 14(7): 736. <https://doi.org/10.3390/educsci14070736>
- Hake R (2012). Helping students to think like scientists in Socratic dialogue-inducing labs. *The Physics Teacher*, 50(1): 48-52. <https://doi.org/10.1119/1.3670087>



- Henriksen D, Henderson M, Creely E, Ceretkova S, Černochová M, Sendova E, Sointu ET, and Tienken CH (2018). Creativity and technology in education: An international perspective. *Technology, Knowledge and Learning*, 23: 409-424. <https://doi.org/10.1007/s10758-018-9380-1>
- Ho TKL, Lin HS, Chen CK, and Lee L (2017). The development and evaluation of a tablet painting application for enhancing the artistic expression skills of students through reflection. *Computers and Education*, 115: 56-68. <https://doi.org/10.1016/j.compedu.2017.07.012>
- Knutz E and Markussen T (2014). The role of fiction in experiments within design, art and architecture-Towards a new typology of design fiction. *Artifact: Journal of Design Practice*, 3(2): 8.1-8.13. <https://doi.org/10.14434/artifact.v3i2.4045>
- Kolb DA (2014). *Experiential learning: Experience as the source of learning and development*. Second Edition, Pearson Education, Upper Saddle River, USA.
- Kühnapfel C, Fingerhut J, and Pelowski M (2023). The role of the body in the experience of installation art: A case study of visitors' bodily, emotional, and transformative experiences in Tomás Saraceno's "In Orbit." *Frontiers in Psychology*, 14: 1192689. <https://doi.org/10.3389/fpsyg.2023.1192689> **PMid:37529312 PMCID:PMC10389276**
- Laske O (2023). *Advanced systems-level problem solving, Volume 3: Manual of dialectical thought forms*. Springer Nature, Cham, Switzerland. <https://doi.org/10.1007/978-3-031-40339-2>
- Lehane L (2020). Experiential learning—David A. Kolb. In: Akpan B and Kennedy TJ (Eds.), *Science education in theory and practice*. Springer Texts in Education. Springer, Cham, Switzerland. [https://doi.org/10.1007/978-3-030-43620-9\\_17](https://doi.org/10.1007/978-3-030-43620-9_17)
- Leonido L, Pereira A, Mendes L, Rodrigues JB, and Morgado EM (2023). Art education: Two decades of creation, evaluation and application of an interdisciplinary method of artistic literacy. *Education Sciences*, 13(6): 589. <https://doi.org/10.3390/educsci13060589>
- Li Z (2023). Moral responsibility, the author, and the ethical criticism of art. *Philosophia*, 51: 2479-2496. <https://doi.org/10.1007/s11406-023-00691-4>
- Liu CH and Matthews R (2005). Vygotsky's philosophy: Constructivism and its criticisms examined. *International Education Journal*, 6(3): 386-399.
- Manresa G (2020). Towards a philosophy of installation art: Symposium. *The Journal of Aesthetics and Art Criticism*, 78(3): 333-338. <https://doi.org/10.1111/jaac.12733>
- Nimkulrat N (2009). *Expressive material in textile art from an artist's viewpoint*. Ph.D. Dissertation, School of Arts, Design and Architecture, Espoo, Finland.
- Orlova A (2020). Installation as a "featured" form of art. In the 4<sup>th</sup> International Conference on Art Studies: Science, Experience, Education, Atlantis Press: 98-103. <https://doi.org/10.2991/assehr.k.200907.018>
- Pelowski M, Leder H, Mitschke V, Specker E, Gerger G, Tinio PP, Vaporova E, Bieg T, and Husslein-Arco A (2018). Capturing aesthetic experiences with installation art: An empirical assessment of emotion, evaluations, and mobile eye tracking in Olafur Eliasson's "Baroque, Baroque!." *Frontiers in Psychology*, 9: 1255. <https://doi.org/10.3389/fpsyg.2018.01255> **PMid:30127756 PMCID:PMC6088181**
- Samaniego M, Usca N, Salguero J, and Quevedo W (2024). Creative thinking in art and design education: A systematic review. *Education Sciences*, 14(2): 192. <https://doi.org/10.3390/educsci14020192>
- Savluk H, Polovina O, Kondratets I, and Dovbnia S (2021). Fostering artistic reflection skills in student pre-school educators seen as artistic competence development. *European Journal of Educational Research*, 10(3): 1303-1315. <https://doi.org/10.12973/eu-jer.10.3.1303>
- Veraksa N, Basseches M, and Brandão A (2022). Dialectical thinking: A proposed foundation for a post-modern psychology. *Frontiers in Psychology*, 13: 710815. <https://doi.org/10.3389/fpsyg.2022.710815> **PMid:35769743 PMCID:PMC9235839**
- Widodo T (2020). Exploration and experimentation in modern art: Painting in a personal style. *KnE Social Sciences*, 4(12): 493-502. <https://doi.org/10.18502/kss.v4i12.7622>
- Zhuo A, Sirivesmas V, and Punyalikit R (2023). Application research of installation art based on digital media. In the 2<sup>nd</sup> International Conference on Intelligent Design and Innovative Technology, Atlantis Press: 289-297. [https://doi.org/10.2991/978-94-6463-266-8\\_31](https://doi.org/10.2991/978-94-6463-266-8_31)