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Learning Painting Based on Ecological Wisdom: A Development Research to Enhance Visual-Spatial Intelligence of Universitas Negeri Medan Students

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ABSTRACT
This research is motivated by the lack of optimal learning activities and processes in developing students' spatial visual intelligence rationally and logically to create painting art in the UNIMED Fine Arts Education study program. This research aims to improve visual spatial intelligence and the quality of student paintings through the development of an ecology-based painting learning model. This development research uses the 4D model (defining, designing, developing, and disseminating). Based on the results of the study, it is known that; the design of the ecological wisdom-based painting learning model is based on an ecopedagogical learning approach. The design of this ecological wisdom-based painting learning model concretely adapts the syntax of the ELM Eco EA learning model and the free expression learning method. The adaptation of the ELM Eco EA learning model and free expression learning method is the basis for the design of the developed ecology-based painting learning model. The syntax and learning steps of these models and methods were reconstructed to produce a more contextualized hypothetical painting learning model design consisting of several steps, namely; 1) Preparation; 2) Providing Stimulus; 3) Investigation; 4) Determination of Theme; 5) Preparation of Tools and Materials; 6) Implementation; 7) Evaluation. After the developed learning model has met the eligibility criteria, overall the results of the data analysis of this trial are effective, this can be seen from the criteria for achieving classical completeness, achieving learning objectives, and student responses in accordance with the criteria specified in the learning and material studied.

KEYWORDS

Drawing, Sketching, Visual Spatial, Ecological, Wisdom

INTRODUCTION

Painting courses require students' basic abilities to be able to show and demonstrate in theory and practice creating works of painting based on observations of the objects they see (Manurung & Sugito, 2017). One of the achievement indicators in this course is the creation of student painting products with certain forms that are able to meet aesthetic needs with skills that meet the desires of connoisseurs or society. In an effort to achieve these achievement indicators optimally, students must have the ability to explore ideas and understand the elements of painting, especially in understanding the objects being painted. For this reason, students must be equipped with qualified visual spatial intelligence. As Musfiroh (in (Ratnasari, 2020) said that visual spatial intelligence is the ability to see in detail, to see all the objects observed. Therefore, the ability to paint students is directly proportional to students' visual spatial intelligence.

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Success in the learning process and course achievement is basically influenced by many factors, including lecturers, students, environment, curriculum, and effective learning models and media. To create learning that is interesting and can improve students' abilities, lecturers must be able to choose the right learning model according to the lecture material being taught (Febianti & Joharudin, 2018). In the context of this research, lecturers must be able to facilitate painting learning that can improve students' visual spatial intelligence and the quality of their paintings.

Based on the empirical experience of researchers and several lecturers of the Fine Arts Education Study Program, the visual spatial ability of students, especially early semester students in painting courses is very low, it appears when students are tested on their ability to show aesthetic objects, skill processes, and techniques for creating works. Most students get substandard grades and do not even fully understand the object of the painting created, it shows that the ability of students in painting courses is very low (Muslim et al., 2024).

One of the factors causing the problem conditions experienced by students in the Fine Arts Education Study Program is triggered by the less than optimal learning process used by lecturers. In fact, the learning process guided by lecturers can determine the success of students in painting activities (Muslim et al., 2024), (Kartono et al., 2020), (Azis et al., 2021). Therefore, the learning model used by lecturers must be able to accommodate learning well in order to improve students' painting skills. One of the learning models offered in this context is an ecological wisdom-based painting learning model. According to Sugiarto (2017), the natural environment, in this case called ecological wisdom, can be used as a learning resource in fine arts learning. Ecological wisdom is an open and multidimensional learning source that can be a source of ideas for artistic expression.

Some previous studies such as Miller & Cardamone (2021). Educating Through Art, Ecology, and Ecojustice: A Rain Barrel Project. Art Education, revealed the success of an ecology-based art learning program conducted in America as a result of the collaboration of junior high school art teachers, art students, and university art education professors. The research designed the curriculum so that students could explore compelling environmental issues and use art to educate members of the local community. The research demonstrated the success of the program as students enthusiastically produced quality ecologically-based artworks. In line with that, another study (Pylypchuk et al., 2021). Ecological Innovations of Materials in Art Objects to Create a Comfortable Human Environment, develops modern innovative approaches to the use of certain art materials in various types of fine art, in ecological interior design to create the desired aesthetic effect and comfortable human environment. One of them is in painting, which develops a visual form with the theme of nature as the idea of creation and the use of innovative materials. The research succeeded in creating works of art with high aesthetic quality by prioritizing ecological materials and concepts.

Another research revealed by (Mamur & Çelik, 2023) who tried to implement an environmental and art-based project in a school art program involving 18 participants. Such as combining phenomenology with an arts-based research approach and gathering information from interviews, worksheets, and artwork, this study aimed to assess the participants' environmental consciousness and explain their emotional connection to the environment. The results of this study demonstrated that ecological art inquiry significantly improved students' environmental knowledge, particularly in raising environmental awareness, which in turn improved students' creative abilities. Based on several previous research reviews, it was found that the position of this research is to try to design an ecological-based painting learning model with systematic learning syntax by departing from an ecological-based learning approach and free expression methods aimed at improving students' visual spatial abilities and skills that have never been done before in Fine Arts Education, Unimed.

Howard Gardner (in (Hoerr et al., 2010), the ability to accurately perceive the visual world, form and modify initial perceptions, and recreate experiences—even when physical stimuli are not present—is known as visual spatial intelligence.. Someone who has visual spatial intelligence can usually enjoy maps and charts, likes to draw, design and make things, think three-dimensionally, enjoy puzzles, like photos and videos, enjoy color and design, enjoy patterns and geometry, and like to doodle. Visual-spatial intelligence refers to the capacity to comprehend, process, and think in terms of images. A person with this skill is able to translate the images in their mind into two- or three-

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dimensional form. A child with this ability is also able to easily and quickly grasp spatial concepts and looks enthusiastic when doing activities related to this ability (Hoerr et al., 2010).

Haas (in R. Oktaviani, 2021) classifies the characteristics of students' visual spatial intelligence including; (1) Imagining; (2) Conceptualizing; (3) Problem solving; (4) Pattern seeking. In line with that, according to Armstrong (in Dita Safitri, 2022) visual spatial intelligence has characteristics including; (1) Perception─which is capturing and understanding something through the five senses. Activities compile, recognize, and interpret sensory information to provide a picture and understanding of the environment or describe objects. (2) Spatial visual - something related to the ability of the eye, namely understanding color and space. Solving an object problem is then connected to the concept to solve the problem. (3) Transformation─ converting the formations of things captured by the eye into another form. For example, seeing a mountain view, then recording the object in the mind and then interpreting it into a painting.

Drawing and painting exercises that are motivated by desire, imagination, and creativity as a means of self-expression are one way to develop visual spatial intelligence. In this situation, teachers must also provide a variety of resources to foster children's imaginations, including a number of tiny objects, people, animals, and so forth (Sujino, in Novita Rizki et al., 2020). Drawing and painting are processes that include pouring thoughts, imagination, sentiments, and experiences using certain tools in order to visually and cognitively convey what is felt and experienced through lines and colors (Sembiring in Nainggolan et al., 2018).

Taking into account the description of the problems of low visual-spatial abilities and the quality of student paintings in painting courses, as well as the potential of art learning models with an ecological perspective, the author intends to provide solutions, especially in painting courses for early semester students, namely by developing an ecological wisdom-based painting learning model to improve visual-spatial intelligence and the quality of painting works of fine arts students at Medan State University

METHOD

Research and Development (R&D) is the type of research that is being used. There are various models used in the research and development process. The 4-D development model is the model that is employed. One development model for learning devices is the 4-D (Four D) model. This model was developed by (Thiagarajan, 1974). The 4-D development model consists of 4 main stages, namely: Define; the defining stage by establishing the basis for the development of learning models from the ELM Eco EA learning model and the free expression method. Design; the design stage by creating the syntax and elements of the new learning model designed. Develop; the development stage by validating the feasibility of the learning model by experts. Disseminate; the dissemination stage by conducting a trial use of the learning model that has been feasible to be used by students. This 4-D method was chosen with the aim of producing a product in the form of a guided demonstration learning model with a differentiation strategy to improve the quality of sketch drawing artwork of UNIMED Fine Arts Education students. The research flow is as follows.

1. Conduct simple observations related to learning conditions and painting skills of fine arts students..
2. Establish the design basis of the learning model reconstructed from the ELM Eco EA learning model and the free expression painting method.
3. Design and produce learning syntax as well as elements of the learning model.
4. Validating the feasibility of the learning model by expert lecturers using Likert scale assessment and descriptive percentage calculation.

$$\overline{X} = \frac{\sum x}{N}$$

Description :

$\overline{X}$: Average assessment score
$\sum x$: Total score
N : Number of items/subcomponents

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The Descriptive Percentage (DP) category is determined by making a category table that is compiled with the following calculation:

Table 1 **.** Learning Model Design Feasibility Assessment Criteria

Percentage	Eligibility Criteria
81%-100%	Very Decent
61%-80%	Feasible
41%-60%	Decent Enough
21%-40%	Not Decent
0%-20%	Very less worthy

Source: (Purwanto, 2006)

5. Testing the use of the learning model on students. Concretely assess student paintings as products produced in the learning process.

RESULT AND DISCUSSION

1. Basis for Design Development of Ecological Wisdom-Based Painting Learning Model

The development of an ecological wisdom-based painting learning model is based on the ecopedagogy learning approach. Ecopedagogy is a learning approach that makes learners (students) independent learners and able to develop potential based on their personal experiences from outside the classroom, so that their abilities not only have an impact on themselves, but their environment (Gadotti, in (Suriansyah et al., 2021). In its implementation in learning, ecopedagogy proposes three important points in its concept, namely social ecology, cultural literacy, and the use of creative and critical technology (Kahn, in Kopnina & Bedford, 2024).

In addition to being based on an ecopedagogical learning approach, the development of this ecological wisdom-based painting learning model design concretely adapts the syntax of the ELM Eco EA learning model initiated by Lestari, Paidi, & Suyanto, S., (2023) which consists of; (1) Orientation; (2) Emotions; (3) Watching; (4) Hypothesis; (5) Thinking; (6) Investigation; (7) Communication, and the free expression learning method, which gives students the freedom of expression to express their ideas and feelings into works of art without being limited by obstacles arising from conventional technical provisions in creating images (Sobandi, in Maya et al., 2023). This method has several learning steps namely; (1) Determining the Theme; (2) Preparing Media; (3) Providing Stimulus; (4) and Communicating. The adaptation of the ELM Eco EA learning model and the free expression learning method described is the basis for designing the developed ecological-based painting learning model. The syntax and learning steps are both reconstructed so as to produce a hypothetical model design of painting art learning that is more contextualized. The basic design of learning design can be seen in the following figure.

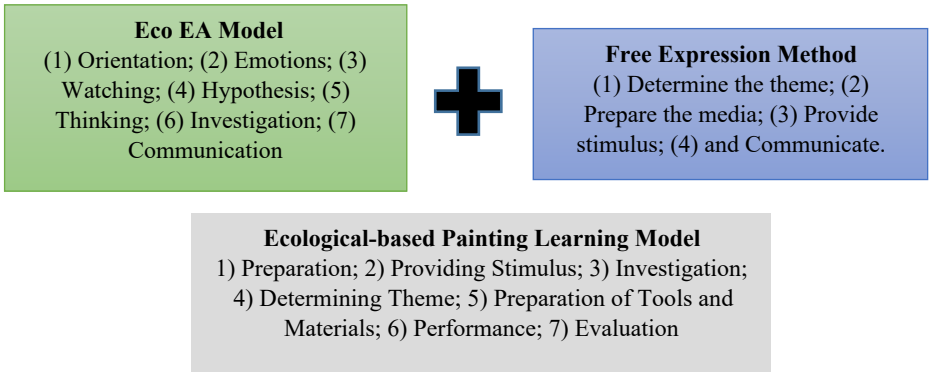

Figure 1. Basic Design of Learning Model

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2. Design of an Ecological Wisdom-Based Painting Learning Model

This section explicitly displays the design design of the ecological wisdom-based painting learning model, which includes an explanation of the learning model syntax as determined.

Table 1. Syntax of Ecological-based Painting Learning Model Design

Syntax	Description
1) Preparation	Preparation begins at the start of learning in class. Lecturers and students together conduct learning orientation. Lecturers provide an understanding of the objectives and benefits of learning ecological wisdom-based painting.
2) Providing Stimulus	Students are asked to observe paintings and videos with the theme of ecological wisdom. Lecturers as facilitators ask some basic questions about types of painting with ecological themes and ask students' opinions on the paintings shown.
3) Investigation	Students conduct field investigation activities either directly in the surrounding environment or by conducting indirect reviews through exploration in the mass media or sources available on the Internet. Students are asked to list objects according to the theme of ecological wisdom.
4) Determining Theme	The determination of the theme is carried out by lecturers together with students after investigating various inspirations of ecological wisdom that will be used as a source of painting creation.
5) Preparation of Tools and Materials	Students prepare all the tools and materials and facilities that will be used in conducting painting activities.
6) Performance	Students show their work by practicing painting directly in the classroom. This activity must be monitored by lecturers as instructors and facilitators throughout the painting process.
7) Evaluation	This evaluation activity is the final stage in learning activities. This activity is filled with activities to assess student painting works directly in front of the class with the aim of reflecting and evaluating the work produced, so that students know the strengths and weaknesses in their work.

The learning model, as a conceptual design that outlines a methodical process for structuring the learning activities, goes beyond merely discussing syntax as a series of executed learning steps. The learning process must include required components in the learning model that has been designed. These elements include syntax, social systems, reaction principles, support systems, and instructional and sender impacts (Joyce in Rahmi et al., 2022). The following is a description of the design elements of the ecological wisdom-based painting learning model.

Table 2. Design Elements of Ecological-based Painting Learning Model

Elements	Description
Syntax	1) Preparation; 2) Providing Stimulus; 3) Investigation; 4) Determining Theme; 5) Preparation of Tools and Materials; 6) Performance; 7) Evaluation
Social systems	The design of this ecological wisdom-based painting learning model is designed to facilitate collaborative learning between lecturers, students, and the surrounding environment. Therefore,

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	this model will be able to influence the social learning atmosphere, allowing all students to learn together.
Reaction principles	The design of this ecological wisdom-based painting learning model will create a response between students and lecturers through contextual painting activities. In all steps of the activity, the lecturer is the facilitator and evaluator of the process, while the student is the executor of learning, so that the learning process will produce reciprocity between the two.
Support systems	The design of this learning model certainly uses facilities and infrastructure that are coordinated through the stages of preparation of tools and materials, thus requiring lecturers and students to prepare learning media to support painting activities.
Instructional and sender impacts	The instructional impact is obtained from the results of student work after learning activities through the performance stage. Then in the accompanying impact produced, students can be creatively trained in painting with the theme of ecological wisdom, so that it will support visual-spatial intelligence and the quality of the paintings produced.

It is projected that the concept of creating an ecological wisdom-based painting learning model will have an impact on the advancement of science, particularly with regard to painting instruction for college students. As revealed in the research of Riyanti, (2018), who tried and succeeded in developing a project-based learning model in fine art graphics courses. The creation of a learning model that is contingently implemented by instructors is said to directly affect how competent students become. Likewise, Frolikova et al. (2020) revealed that it is important to instill a pedagogical learning model based on intercultural and environmental interactions for students in higher education.

Setem, (2021), also revealed that ecological-based fine art learning will produce unique and imaginative works, so that students as creators and the public as connoisseurs of works get inspirational artistic values to foster ecological awareness. Therefore, the design of the ecological wisdom-based painting learning model developed is an effort to create visual spatial intelligence to improve students' painting skills and bring humanist and quality learning directions.

3. Learning Model Feasibility Validation

Prior to testing the learning model, it is initially validated by experts to evaluate the effectiveness of its components. This validation process involves providing the model to the validators along with a validation form. The results obtained at this expert validation stage are as follows.

Table 3. Results of Expert Validation of Learning Model Design

	Aspect	Indicators	Score
1.	Rasional Model	Strong foundation in developing the model	4
		The rationale for model development is relevant to the model developed	4
2.	Teori Pendukung Model	Contains supporting theories of the developed model	3
		Coverage of theories of learning models based on multidimensional perspectives and exploration	4
		The explanation of each theory can be clearly understood	3
3.	Sintaks	Clear work steps	4
		High level of syntax implementation	3
		Syntax phases include work exploration activities	4

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4.	Sistem Sosial	Students and lecturers engage in conversation.	3
		Students are interacting with one another.	4
		There is interaction between students and the environment	4
5.	Prinsip Reaksi	Students are seen to be active	4
		Students are enthusiastic to learn/paint artworks	4
		The lecturer's role as a facilitator is visible	3
6.	Sistem Pendukung	Learning activities are clearly organized in the learning plan	4
		There are books supporting learning activities	4
7.	Dampak Penerapan	The learning model designed has an impact on students	3
		Impact on students' attitude to respect each other	3
		There is an increase in the ability to learn/paint works of art	4
		Students' interest in studying and creating art has increased.	4
		Total score	73
		Percentage	91.25%

Based on the results of learning design expert validation, a value of 91.25% was obtained . This means that the learning model developed is included in the “very feasible” eligibility criteria category and the description of the notes “no need for revision”. Therefore, the ecological wisdom-based painting learning model can be tested in painting learning activities.

4. Testing And Dissemination Of Learning Models

After the developed learning model has met the eligibility criteria. Then, this learning model was tested at the research site, namely a limited trial conducted in class A of the Fine Arts Education Study Program Batch 2023 with 32 students. The purpose of this experiment was to evaluate the quality of student paintings and the efficacy of the ecological wisdom-based painting learning model, which was created to enhance visual-spatial intelligence. The criteria for attaining classical completeness, learning objectives, and student responses in line with the designated criteria for learning and learning materials demonstrate that the trial's data analysis results are generally effective. The following is the data on the results of student performance using the ecological wisdom-based painting learning model.

Table 4. Recap of Students' Proficiency/Painting Art Grades

No	Score range	Description	Total number of students
1	85-100	Very good	3
2	75-84,9	Good	16
3	65-74,9	Sufficient	12
4	51-64,5	Deficient	1
5	≤ 50	Very less	0
	Total		32
	Average value		76,25

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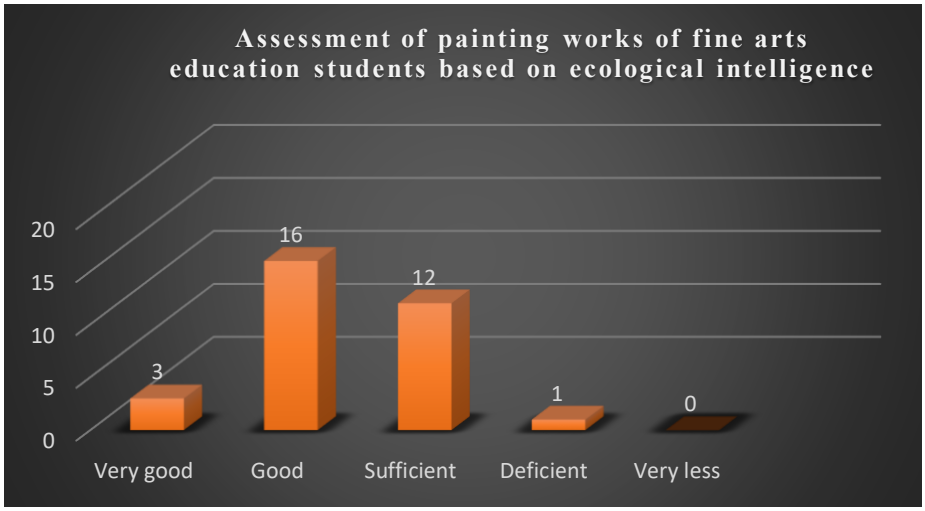

Figure 2. Assessment of Painting Works of Fine Arts Education Students Based on Ecological Intelligence

The dissemination stage is the final phase of the ecological wisdom-based painting learning model's development. The last phases of final packaging, diffusion, and adoption are the most crucial but frequently disregarded, according to Thiagarajan et al, (1974), the goal of the dissemination stage is to encourage users—individuals, groups, or systems—to accept the developed products. To create the proper form, materials must be packaged carefully. Here are a few paintings created by the student..

Figure 3. Ecological-based student painting activity

CONCLUSION

The design of the ecological wisdom-based painting learning model is based on the ecopedagogy learning approach, according to the findings of the research that was done. The ELM Eco EA learning model's syntax and the free expression learning method are both concretely adapted in the design of this ecological wisdom-based painting learning model. The developed ecological-based painting learning model is based on the adaptation of the ELM Eco EA learning model and the free expression learning method. The syntax and learning steps of the model and method are reconstructed to produce a hypothetical model design of more contextualized painting art learning which consists of several steps namely; 1) Preparation; 2) Providing Stimulus; 3) Investigation; 4) Determination of Theme; 5) Preparation of Tools and Materials; 6) Performance; 7) Evaluation. The learning model also obtained a feasibility test of 91.25% with a description of 'very good and feasible' as a painting learning model, as well as a usage trial with the acquisition of an average student painting

score of 76.25, so that the ecological-based painting learning model developed is said to be suitable for use as one of the student painting learning models

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