

Development of Edu Uno-Based Teaching Aids to Improve Critical Thinking on the Subject of Types and Patterns of Decorative Art in V Grade Elementary School

Listiya Damayanti Permatasari¹, Titi Anjarini², Ageng Triyono³

^{1,2,3}Department of Primary School Teacher Education, Muhammadiyah University of Purworejo, Indonesia

[*damayantilistiya80@gmail.com](mailto:damayantilistiya80@gmail.com)

Abstract

The lack of critical thinking skills among fifth-grade elementary school students in comprehending creative content on types and patterns of decorative motifs necessitates the development of Edu Uno-based teaching aids as interactive learning media. This study aims to develop Edu Uno game-based instructional tools to enhance students' critical reasoning on the aforementioned material. The approach employed is the Research and Development (R&D) model adapted from ADDIE, validated by media experts (score: 4.57) and material experts (score: 4.65), both deemed highly feasible. Limited trials on 10 students yielded 62.69% effectiveness (moderate category), while field trials on 21 students achieved 73.16% (high category), with N-Gain scores in the high category. Questionnaire results from 31 students (98.6%) and one teacher (100%) indicated that the teaching aids are highly practical and suitable for sustained use. This development is expected to serve as an innovative solution for improving learning quality and student competency achievement effectively.

Keywords: Game, Critical Reasoning, UNO

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INTRODUCTION

Art education in elementary schools holds a strategic position in shaping students' character, creativity, and critical thinking skills from an early age. Specifically, on the topic of types and patterns of decorative motifs in fifth-grade elementary school, art learning serves as a vital medium for students to express visual ideas, enrich aesthetic insights, and develop imaginative potential (Primawati, 2023). However, field realities still indicate the dominance of conventional learning methods that lack interactivity and fail to stimulate students' motivation, active engagement, and critical thinking abilities (Hasriadi, 2022).

Low student engagement and motivation in art learning are closely linked to the limited use of innovative and interactive instructional media. Instructional media play a crucial role as effective intermediaries in delivering messages and creating a conducive learning environment (Khasanah et al., 2021). Teachers are not only required to utilize available media but also to innovate in developing contextual learning media aligned with the characteristics of the subject matter and students

(Retnaningsih, 2023; Rohmani et al., 2023). Critical thinking skills hold significant importance for future life, yet Indonesian students' critical thinking abilities remain relatively low to date (Triyono et al., 2022).

Fine Arts

Fine arts represent one branch of art manifested through formal elements and appreciated through visual senses (Primawati, 2023). In the context of elementary school learning, fine arts extend beyond mere aesthetic activities to serve as a strategic medium for honing creativity, fostering imagination, and developing critical thinking skills. Art learning, particularly on types and patterns of decorative motifs, requires processes of observation, analysis, and visual idea exploration, thereby training students in decision-making, evaluation, and problem-solving (Marni & Mayar, 2023).

Fajrie (2023) emphasizes that mastery of fine arts concepts-comprehensive and profound-is essential for students to apply them flexibly across various contexts. However, the implementation of fine arts learning in classrooms often remains dominated by conventional instructional patterns that inadequately engage students actively. Such learning methods tend to render students passive and limit their optimal expression of creative ideas (Hasriadi, 2022; Ramadhani et al., 2023).

Teaching Aids

Teaching aids play a vital role in strengthening the learning process, particularly in delivering complex concepts in a concrete and easily comprehensible manner (Djong et al., 2021). Their presence can yield tangible impacts by directing learning objectives, arousing interest, and enhancing student motivation in instruction (Nurbaiti et al., 2023). In the context of fine arts, teaching aids function as visualization media capable of reducing conceptual misunderstandings, clarifying subject matter, increasing focus, and enriching students' learning experiences (Suliani, 2020).

The use of game-based teaching aids in fine arts learning is highly relevant to the constructivist approach, which emphasizes the importance of real experiences as the foundation for knowledge construction. Interactive teaching aids not only provide concrete learning experiences but also encourage students to actively interact, explore, and develop understanding through direct engagement. Furthermore, teaching aids can instill character values such as collaboration, sportsmanship, and mutual cooperation, aligning with the reinforcement of the Pancasila Student Profile in the Merdeka Curriculum (Misbahudholam et al., 2023).

Edu UNO

Edu UNO is a creative adaptation of UNO cards modified for educational and interactive learning purposes. This medium is specifically designed to accommodate decorative motif content through cards featuring elements of types, patterns, and motifs, making the learning process more enjoyable, challenging, and motivating for students (Waritsa Firdausi et al., 2021). Through a game-based approach, Edu UNO not only facilitates subject matter learning but also integrates the development of critical thinking skills, collaboration, communication, and problem-solving.

Previous research by (Harlin & Arini, 2023) has proven that UNO card-based instructional media effectively improve learning outcomes on weight units in fourth-grade elementary school. However, no studies have yet developed and tested the effectiveness of Edu UNO on types and patterns of decorative motifs in fifth-grade elementary school. Therefore, the development of Edu UNO teaching aids in this context offers novelty and empirical contributions to fine arts instructional media development in elementary schools.

Based on interviews with SBdP teachers at SD Muhammadiyah 1 Purworejo (2025), fifth-grade students face specific difficulties with types and patterns of decorative motifs: struggling to differentiate flora-fauna from geometric forms (60% of students failed identification) and creating symmetric patterns without interactive visual guidance. The teacher stated, "Students memorize motif names but cannot analyze rhythmic patterns or regional motif stylization" (Teacher W Interview, 2025), which diminishes visual critical thinking. Thus, Edu Uno teaching aids are needed for pattern matching simulations and creative inference.

The use of Edu UNO is expected to provide concrete, enjoyable, and interactive learning experiences, motivating students to innovate in creating decorative motifs (Hasriadi, 2022). This medium is also designed to be economical, easily reproducible, and reusable. With these characteristics, Edu UNO is believed to serve as an innovative solution for enhancing fine arts learning quality in fifth-grade elementary school, particularly on types and patterns of decorative motifs that demand high creativity and critical thinking.

This study addresses this gap by developing, validating, and testing the effectiveness of game-based Edu UNO teaching aids. Therefore, the research aims to produce innovative Edu UNO-based instructional media that is valid, feasible, and effective in enhancing students' critical thinking and creativity skills, while providing empirical contributions to fine arts instructional media development (Andryan & Wijayanti, 2024; Kholida & Sutama, 2020; Pramudya & Wijayanti, 2024).

RESEARCH METHODS

The objective of this study is to develop and test the effectiveness of Edu UNO-based teaching aids on the subject of types and patterns of decorative arts for fifth-grade elementary school students. The method employed is the Research and Development (R&D) method. R&D methodology involves researching, designing, producing specific products, and testing their effectiveness. In the educational context, development research aims to produce innovative and effective teaching materials or instructional media (Sugiyono, 2018).

The development model utilized is the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). The ADDIE model was selected due to its suitability for teaching aid development, as it assists researchers in thoroughly identifying student needs and subject matter characteristics. The ADDIE model concept is applied as a framework for developing basic skills in the learning process, specifically the instructional product design development concept (Filahanasari et al., 2024). The stages of the ADDIE model and detailed activities are presented in Figure 1.

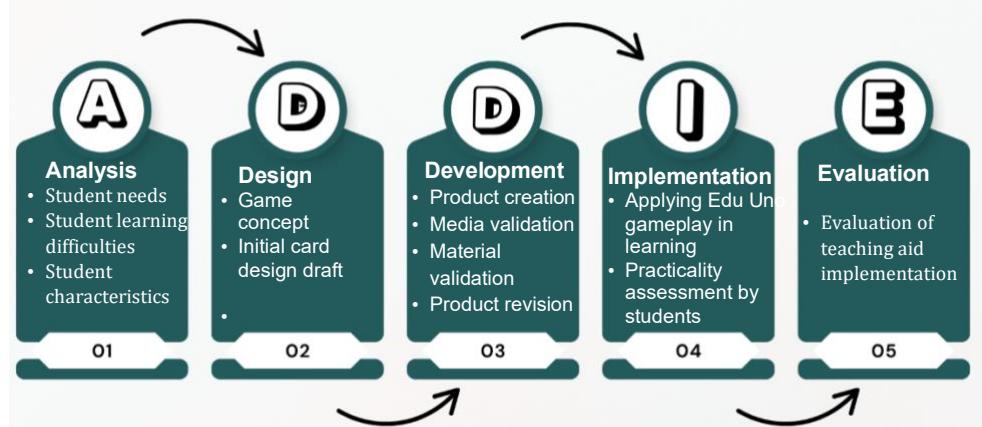


Figure 1. Stages of ADDIE Model Implementation

Research participants consisted of 31 fifth-grade students from SD Muhammadiyah 1 Purworejo, comprising 10 students for limited trials and 21 for field trials, plus 2 lecturers and 2 teachers as validators. Data collection followed the ADDIE stages systematically: the analysis stage began with student needs surveys ($n=31$), observation of decorative motif difficulties, and student characteristics analysis as the media design foundation; the design stage involved conceptualizing Edu UNO with 64 cards (34 question cards, 20 content cards, 10 challenge cards) including color selection and engaging visual elements; the development stage encompassed prototype production, validation by 2 lecturers and 2 teachers using a 1-5 Likert scale, and revisions based on feedback; the implementation stage included pretest and posttest (10 limited trial students and 21 field trial students) along with student and teacher response questionnaires; and the evaluation stage assessed overall media effectiveness, ease of use, and attractiveness.

Data were collected through expert validations, student and teacher response questionnaires, and pretest-posttest assessments. The following present the teaching aid validity criteria from media and material aspects (Table 1), practicality criteria (Table 2), normalized gain criteria (Table 3), and teaching aid effectiveness level criteria (Table 4) used in this research.

Tabel 1. Kriteria Kevalidan

Criteria	Category
1,00 – 2,49	Not Valid
2,50 – 3,32	Less Valid
3,33 – 4,16	Valid
4,17 – 5,00	Highly Acceptable

(adapted from Adam et al. 2024)

The mean score can be calculated using the following formula:

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

Description:

X = Mean score

$\sum x$ = Total score

N = Number of items

Table 2. Practicality Criteria

Interval % Score	Category
$75\% < \text{skor} \leq 100\%$	Very Good
$50\% < \text{skor} \leq 75\%$	Good
$25\% < \text{skor} \leq 40\%$	Not Very Good
$\leq 25\%$	Not Good

(adapted from Adam et al. 2024)

The teacher and student response questionnaire assessment was conducted using the following formula:

$$\text{Presentase} = \sum \left(\frac{\text{Total obtained scores}}{\text{Maximum possible total scores}} \right) \times 100\%$$

Instructional media are deemed highly effective if both student and teacher response scores exceed 50, and categorized as excellent when both scores surpass 75%.

Table 3. Normalized Gain Criteria

N-Gain Value	Intepretation
$0,70 \leq g \leq 100$	High
$0,30 \leq g < 0,70$	Moderate
$0,00 < g < 0,30$	Low
$g = 0,00$	No Increase
$-1,00 \leq g < 0,00$	Decrease Occurred

(adapted from Sukarelawa et al. 2024)

Normalized gain (N-Gain) interpretation criteria were used to measure improvements in student understanding post-instructional media intervention. The normalized gain (N-Gain) value was calculated using the following formula:

$$N \text{ Gain} = \frac{\text{Skor Posttest} - \text{Skor Pretets}}{\text{Skor Ideal} - \text{Skor Pretest}}$$

Table 4 Effectiveness Criteria

Precentage (%)	Intepretation
<40	Ineffective
40-55	Les Effective
56-75	Moderately Effective
>76	Effective

(adapted from Sukarelawa et al. 2024)

These criteria were applied in the research data analysis to evaluate the impact of the instructional media on student learning outcomes.

RESULTS AND DISCUSSION

The research activities followed the ADDIE model and were completed within 6 months, producing Edu Uno instructional media for decorative pattern content in fifth-grade elementary school fine arts. Results indicate very high validity (scores: 4.57-4.59), N-Gain improvement from moderate (0.63) to high (0.73), and student/teacher responses reaching 98.6%-100%.

Analysis Stage

The analysis stage began by identifying student needs in fine arts learning on the topic of creating types and patterns of decorative motifs in fifth-grade elementary school. The objective was to obtain data required for developing the planned instructional media product (Eviyanti et al., 2025). Based on classroom teacher observations and interviews, most students lacked understanding of the correct sequence for creating decorative motif patterns. Most students drew decorative shapes directly without first determining the base pattern or repetition direction, resulting in random and irregular drawings. Additionally, students struggled with pattern form regularity and composition, such as inconsistent motif sizes or unequal repetition spacing. This condition indicates that students have not grasped that creating decorative motifs requires structured thinking processes from determining base patterns, arranging directions, to balancing and repeating forms.

Student characteristics analysis also revealed that fifth-grade elementary school students prefer visual, interactive, and competitive learning activities. They comprehend material more easily when presented through games offering challenges and collaboration. Based on these characteristics, game-based Edu Uno instructional media is deemed suitable to address existing problems, as it helps students progressively recognize, differentiate, and create decorative motif patterns through enjoyable play activities.

Thus, analysis results indicate the need to develop teaching aids facilitating students' understanding of pattern and decorative motif type concepts while training them to follow correct sequential steps in pattern creation. Edu Uno was developed to meet these needs by providing active, engaging, and meaningful learning experiences for elementary school students.

Design Stage

The first activity in the design stage involved compiling Edu Uno game content and materials aligned with learning outcomes and objectives on types and patterns of decorative motifs. The compiled materials focused on basic concept understanding before creative application, covering: (1) definition of decorative motifs; (2) types of decorative motifs (geometric, floral, and faunal); and (3) pattern concepts and repetition principles in decorative motifs. These materials were then transformed into questions and content packaged as game cards to make them more engaging and accessible for elementary school students.

Edu Uno design adopts Vygotsky's social constructivism through the Zone of Proximal Development (ZPD). Material cards build actual abilities, individual question cards receive teacher scaffolding, and action cards achieve independence. Vygotsky views play as a magnifying glass examining children's potential abilities before actualization in other situations. Edu Uno functions as this 'magnifying glass,' where students practice pattern recognition through gameplay before applying it in decorative motif drawing.

Subsequently, Edu Uno game components were designed, consisting of: (1) Number cards; (2) Reverse cards; (3) Draw two cards; (4) Wild cards; (5) Wild draw two cards; and (6) Game instruction and rules guide cards. These cards contain questions requiring students to think and reason about pattern concepts, materials with brief information and examples of decorative motif types and patterns, and challenges adding gameplay elements and student interaction. Edu Uno implements

gamification through point systems, group competitions, tiered challenges (material, question, and action cards), instant rewards, and immediate feedback.



Figure 2. Components of Edu Uno Cards

The initial Edu Uno design also includes teacher instructions containing guidelines for classroom implementation and targeted learning objectives. This preliminary product draft was designed using simple yet visually appealing layouts and illustrations suitable for elementary school students.



Figure 3. Game Instruction Manual

Development Stage

The developed teaching aid product consists of Edu Uno game-based teaching aids that underwent design and component compilation in the previous stage. These aids feature attractive visuals suitable for elementary school students, using bright colors and contextual decorative motif illustrations aligned with the learning material. Game components include material cards, question cards, action cards, and a game board equipped with a user manual.



Figure 4. Edu Uno Teaching Aids

This Edu Uno-based teaching aid was validated by two lecturers from Muhammadiyah University of Purworejo and two practitioners from SD Muhammadiyah 1 Purworejo. Media expert validation assessed size, external design, and tool design, aligning with Lisa et al. (2021) on media production methods, appearance, form, color selection, readability, durability, ease of use, and storage.

Meanwhile, material expert validation assessed content suitability, language appropriateness, material presentation, and student-supporting learning aspects. These material expert validation results align with Ulfah et al. (2016), who emphasize the importance of material alignment with learning objectives in UNO card game media product development. The assessment results from the validators will be explained below.

Table 5. Edu Uno Validity Assessment Levels

Assessment	Media Expert	Materil Expert
Total Score	239	237
Number of Aspects	52	52
Percentage	4,57	4,59
Critria	Very Suitable	Very Suitable

Based on data in Table 5 and referring to validity criteria adapted from Adam et al. (2024) (Table 2), the average validation scores from the validators ranged from 4.17–5.00, specifically 4.57 from media experts and 4.59 from material experts, falling into the very feasible category. This indicates that the Edu Uno game-based teaching aids are deemed highly feasible, meeting all feasibility aspects in terms of media, material, and practical use.

Based on media expert validator assessments, suggestions included strengthening the teaching aid frame, particularly glued parts, and improving overall product neatness for greater durability and classroom appeal. Meanwhile, practitioner validators recommended supplementing the teaching aid manual with Basic Competencies (BC) and Learning Objectives (LO). This addition is deemed essential to facilitate teachers in systematically integrating Edu Uno gameplay with classroom instructional activities.

These inputs served as the basis for product revisions and refinements. Revisions involved strengthening the teaching aid structure, improving physical appearance

for greater neatness, and adding Learning Outcomes and Learning Objectives components to the user manual. Consequently, the Edu Uno game-based teaching aids became more feasible, practical, and effective in enhancing fifth-grade elementary school students' critical thinking skills on creating types and patterns of decorative motifs. The following shows the post-revision results with stronger structure and complete Learning Outcomes/Learning Objectives guide



Figure 5. Revised Teaching Aids

Implementation Stage

The implementation stage tested the practicality and effectiveness of the developed Edu Uno game-based teaching aids. According to Verawati et al. (2022), instructional media enable teachers to explain concepts to learners and foster more active student engagement during instructional activities. This aligns with Edu Uno implementation goals promoting active student involvement in understanding decorative motif patterns through gameplay.

Activities were conducted in two phases: limited trials and field trials. Both phases followed identical procedures. Students completed pretests first to assess baseline understanding of types and patterns of decorative motifs. Teachers then provided brief introductions to definitions, types, and patterns as gameplay precursors. Students subsequently played using Edu Uno teaching aids containing material and question cards. During gameplay, students discussed and reasoned to determine correct answers based on learned concepts. Learning activities concluded with posttests measuring learning gains, plus response questionnaires assessing media practicality and attractiveness. Teachers also completed response forms evaluating ease of use and instructional support benefits.

Table 6. Comparison of Pretest and Posttest Scores N-Gain Test Limited Trial

	N	Minimum	Maximum	Mean	Std. Deviation
Ngain_Skor	10	.38	.78	.6269	.11979
Ngain_Skor_Persen	10	37.50	77.78	62.6890	11.97922
Valid N (listwise)	10				

Limited trial N-Gain score calculations for 10 students yielded an average of 0.6269, with minimum 0.38 and maximum 0.78. Based on normalized gain criteria, this falls in the moderate category ($0.30 \leq g < 0.70$), indicating Edu Uno teaching aids sufficiently improved student learning outcomes. Additionally, the average N-Gain score in percentage form reached 62.69%, categorized as moderately effective (56–75%). This demonstrates positive impact on student comprehension

enhancement, though not yet highly effective. In this context, Edu Uno teaching aids provided opportunities for active, multisensory learning, deepening conceptual understanding meaningfully. This aligns with Sari & Hakim (2021), who state that learning with teaching aids optimizes sensory functions to enhance effectiveness through listening, viewing, touching, and logical-realistic thinking activities.

Table 7. Comparison of Pretest and Posttest Scores and N-Gain Test Scores for the Wide-Area Experiment

	N	Minimum	Maximum	Mean	Std. Deviation
Ngain_Skor	21	.38	1.00	.7316	.17480
Ngain_Skor_Persen	21	37.50	100.00	73.1555	17.47996
Valid N (listwise)	21				

Field trials involving 21 students yielded an average N-Gain of 0.7316, falling in the high category ($0.70 \leq g \leq 1.00$), with a 73.16% average learning improvement percentage categorized as moderately effective. These results demonstrate that Edu Uno teaching aids became increasingly effective in enhancing student comprehension of the subject matter. Compared to limited trials averaging N-Gain of 0.6269 (moderate category), field trials showed improved teaching aid effectiveness. This indicates that post-revision implementation on larger groups made Edu Uno teaching aids more effective in improving student learning outcomes.

These findings align with penelitian Antaka Adi et al. (2020), who demonstrated that instructional aids significantly enhance students' critical thinking and problem-solving processes based on pretest-posttest results. This improvement also indicates enhanced critical thinking and problem-solving during media-based learning. The findings are consistent with prior research showing card game-based learning fosters positive student attitudes and substantially improves knowledge, motivation, and learning effectiveness (Rahayu et al., 2020). Additionally, meta-analyses indicate game-based learning yields moderate to large effects on cognitive aspects, motivation, and student engagement. These results align with Sintarani et al. (2025), who reported very high fine arts learning improvements (N-Gain 0.75) through crossword puzzle-assisted game-based learning media. Thus, our results support the broader literature that game-based instructional media improve learning outcomes and student motivation. However, specific aspects of decorative motifs in elementary fine arts remain underexplored; this study contributes by filling that gap through curriculum-competency-based Edu Uno development, distinct from conventional media.

Table 8. Results of the Teacher and Student Response Questionnaire

Assessment	Student Responses (31 students)	Teacher Responses
Total Score	979	32
Maximum Score	992	32
Percentage	98,6%	100%
Criteria	Very Good	Very Good

Based on obtained assessment results, responses from 31 students yielded a total score of 979 out of maximum 992, resulting in 98.6% percentage with excellent practicality criteria. Meanwhile, teacher responses achieved a total score of 32 out of maximum 32, or 100%, also falling in the excellent practicality category. These results demonstrate that Edu Uno-based teaching aids for types and patterns of decorative motifs received high appreciation from both groups as highly practical and easy-to-use instructional media. Media practicality was further reinforced by teacher recommendations for peer use, reflecting their satisfaction and confidence in the media's comfort and benefits.

Based on research findings, Edu Uno media is recommended as an innovative alternative in elementary school fine arts learning, particularly for types and patterns of decorative motifs. Teachers are advised to prepare multiple media sets for effective learning, utilize usage guides containing basic competencies and learning objectives for systematic curriculum integration, and habituate students to read instructions and discuss during gameplay to internalize pattern concepts. Additionally, this study implies the need for further development and trials across wider schools and larger student numbers, media variations or digital versions, and institutional support through teacher training and provision of game-based learning facilities as part of active learning strategies in elementary schools.

Evaluation Stage

The evaluation stage was conducted after implementing Edu Uno game-based teaching aids in fifth-grade elementary school lessons on types and patterns of decorative motifs. Overall, the implementation proceeded well and aligned with the planned learning sequence. Learning execution results also indicated good implementation categories, as stated by Azzahroh et al. (2024), categorizing learning evaluation into very good, good, poor, or very poor criteria. Students enthusiastically participated throughout activities from teaching aid introduction, gameplay execution, to final learning reflection.

However, one primary constraint emerged during implementation: limited media quantity. The developed Edu Uno teaching aids consisted of only one set, while 31 students participated. This condition reduced learning efficiency as students took turns using the media. Nevertheless, this constraint did not diminish student interest and engagement in gameplay. Instead, it encouraged greater student activity. Edu Uno effectively reduced cognitive load through information chunking (thematic cards) and spaced repetition (gradual repetition).

Overall, the use of Edu Uno teaching aids proved effective in capturing student attention and facilitating easier comprehension of types and patterns of decorative motifs concepts. Media and material expert validations categorized the product as very feasible, with average scores of 4.57 and 4.59, respectively.

From the effectiveness perspective, trial results demonstrated significant learning outcome improvements. Limited trials (10 students) yielded average N-Gain scores of 0.6269 (moderate-high category), while field trials (21 students) achieved 0.7316 (high category). Additionally, questionnaire results showed 98.6% student responses and 100% teacher responses, both falling in the highly practical category.

The advantages of Edu Uno teaching aids include their attractiveness and interactivity packaged as card gameplay that makes students more enthusiastic

about learning, enhanced critical thinking skills through questions and challenges requiring students to understand and apply decorative motif concepts, ease of use for teachers accompanied by a comprehensive manual with Learning Outcomes and Learning Objectives, and reusability without requiring electronic devices or internet connectivity.

Study Limitations

This research is limited to fifth-grade students, thus results cannot be generalized to other grades or educational levels; learning materials cover only "types and patterns of decorative motifs" in fine arts, not the entire fifth-grade curriculum; and interventions focus solely on Edu Uno teaching aid development without comparisons to other media such as flashcards or digital tools.

CONCLUSION

The design and development stages produced attractive, user-friendly Edu Uno teaching aids equipped with comprehensive teacher guides. Media expert validation (score: 4.57) and material expert validation (score: 4.59) indicated very high validity categories. Limited trials achieved moderate N-Gain (0.6269 or 62.69% effective), while extensive trials yielded excellent results (0.7316 or 73.16%). Student questionnaires (98.6%) and teacher questionnaires (100%) confirmed practicality and enjoyment, promoting active participation and critical thinking. Despite media quantity constraints, student enthusiasm remained high. Edu Uno meets validity, practicality, and effectiveness criteria for teaching decorative motifs in fifth-grade elementary school. Implications include support for the Merdeka Curriculum, enrichment of game-based Cultural Arts learning, and a constructivist media development model for other subjects. Future research suggestions encompass mass production, adaptations for other grades, and long-term retention evaluations.

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