

# TPACK-Based Media Innovation to Enhance Students' Floral Ornament Drawing Skills

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## ABSTRACT

Floral ornament drawing is a fundamental component of visual arts education, fostering not only technical skills but also creativity and environmental appreciation. However, conventional teaching methods often fail to fully engage students or optimize their creative potential. This study examines the effectiveness of a Technological Pedagogical Content Knowledge (TPACK)-based media innovation in enhancing students' floral ornament drawing skills. A quasi-experimental design with a post-test-only control group model was employed. The study involved 32 Grade VIII students from SMP Negeri 3 Pattalassang, divided equally into an experimental group using TPACK-based media and a control group using traditional methods. Students were assessed using a standardized drawing rubric evaluating idea originality, creativity of form, color composition, technique, and neatness. Data were analyzed using an independent samples t-test. The experimental group significantly outperformed the control group, achieving a mean score of 91.0 compared to 64.5. The t-test results ( $t = 8.20$ ,  $p < 0.0001$ ) and a large effect size (Cohen's  $d = 2.84$ ) confirmed the substantial impact of the TPACK-based intervention on students' drawing performance across all criteria. The integration of TPACK-based media effectively enhanced students' technical and creative competencies in floral ornament drawing. This innovation supports more interactive, student-centered, and technology-integrated visual arts instruction, aligned with 21st-century learning goals.

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## 1. INTRODUCTION

Visual arts education plays a crucial role in shaping creativity, honing imagination, and developing critical thinking skills in students. Particularly at the Junior High School (SMP) level, visual arts learning is expected to go beyond mere teaching of techniques and aesthetics, but must also encourage students to appreciate art and express their creative ideas independently through visual artwork. However, a

significant challenge faced by teachers is how to design and develop art learning media that not only meets the needs of students but also aligns with the rapid development of the times. Recognizing this, the integration of technology has become a solution in line with technological advances and the demands of modern development. Teachers have a great opportunity to adopt and integrate these technologies effectively into visual arts learning.

Drawing skills, including flora ornament drawing, are an essential aspect of visual arts education as they involve both technical skills and creativity along with visual concept understanding. The use of digital technology has been shown to enhance students' visual literacy and learning motivation (Resti et al., 2024). In line with the digital age, art teachers are expected to present creative, interactive, and adaptive learning media that support 21st-century skills, such as critical thinking, creativity, collaboration, and communication.

As the demands of 21st-century skills—critical thinking, creativity, collaboration, and communication—grow, art teachers are required to present innovative, adaptive, and interactive learning media. One relevant framework for the integration of technology is Technological Pedagogical Content Knowledge (TPACK). TPACK suggests that effective technology-based teaching requires an integrated understanding of content, pedagogy, and technology (Mishra & Koehler, 2006). International research indicates that the implementation of TPACK can enhance the quality of creativity-based, collaborative, and active student learning, including in visual arts and design fields. However, most TPACK research has focused on STEM subjects (Science, Technology, Engineering, and Mathematics), and its application in visual arts education, particularly in flora ornament drawing, remains limited and underexplored. This research gap is an important basis for conducting this study.

In Gowa Regency, the use of technology in visual arts learning at SMP Negeri 3 Pattalassang is still suboptimal due to limited resources (Hasnawati et al., 2024). This situation highlights the need for the development of innovative learning media that can support technology-based learning while maintaining visual arts as the main content. Pitriani et al. (2025) explain that to implement TPACK effectively, a directed competence framework is necessary to address specific pedagogical needs in digital learning. To improve flora drawing skills in Junior High School (SMP) students, TPACK-based media innovation offers an effective strategy. TPACK is a holistic framework that integrates technology, pedagogy, and content knowledge in a synergistic way, where all three are interrelated and support learning processes suited to students' characteristics and needs (Hardanti et al., 2024). Students can easily learn using technology while acquiring the technical skills required in learning (Anuar & Zakaria, 2015). TPACK has successfully drawn attention to the need for teacher knowledge in using technology, enabling them to effectively guide teacher education and ensure readiness for the challenges of the 21st-century classroom (Brantley-Dias & Ertmer, 2013).

Based on this background, this study aims to assess the effectiveness of TPACK-based media in teaching flora ornament drawing at SMP Negeri 3 Pattalassang. It is expected that this approach will enhance students' technical drawing skills (mastery of lines, shapes, and colors), creativity, and learning motivation, as well as significantly contribute to the development of more effective and relevant visual arts learning strategies in the digital era.

## 2. METHODS

This study uses a quasi-experimental design with a post-test-only control group model. This design was chosen because the researcher did not perform random assignment to determine the experimental and control groups, but used existing classes. The study population includes all grade VIII students at SMP Negeri 3 Pattalassang enrolled in the current semester's visual arts class. The sample was determined using purposive sampling, considering similar characteristics in initial abilities across classes. Two classes were selected as samples, each consisting of 16 students in the experimental group (using TPACK-based learning media) and 16 students in the control group (using conventional methods). The sample size was based on the availability of classes and field conditions. Both groups

received the same material and learning flow but differed in their learning media. Data were collected using a flora ornament drawing test (post-test) for both groups to measure differences in flora ornament drawing ability after the learning process. The drawing skills assessment instrument used a rubric with evaluation indicators: idea, creativity of form, colour composition, technique, and neatness. Content validity was tested through evaluations by three experts: two art lecturers and one art teacher. Interrater reliability was calculated using Cohen's Kappa formula from two independent assessors. The reliability value obtained was classified as good. Data analysis used a statistical analysis with an independent samples t-test to examine the difference in mean learning outcomes between the experimental and control groups. The analysis results were used to determine whether the use of TPACK-based media resulted in a significant improvement compared to conventional learning.

### 3. FINDINGS AND DISCUSSION

#### 3.1 Findings

Visual arts education plays an important role in shaping creativity, aesthetic sensitivity, and critical thinking skills in students. In the 21st century, visual arts learning must not only rely on conventional methods but also integrate digital technology to keep pace with the changing times. Teachers must possess the skills to design and use learning media (Afrilia & Pamungkas, 2024). Therefore, art teachers must continuously equip themselves with strong competencies in designing and utilizing innovative learning media to optimize the teaching and learning process in visual arts education.

TPACK (Technological Pedagogical Content Knowledge) is a framework that guides art teachers to align their understanding of art content, teaching approaches, and technology utilization harmoniously (Mishra & Koehler, 2006). This aligns with Gunawan et al. (2020) assertion that through TPACK, students are not just receiving content, but are trained to solve problems, analyze, and draw conclusions, in line with critical thinking skills indicators.

Based on initial observations of visual arts learning activities at SMP Negeri 3 Pattalassang, the use of conventional learning media, such as focusing on textbooks or examples of flora ornament drawings, was found. This affected students' learning outcomes in flora drawing, which were not maximized. (Waluya & Wiyono, 2015) explain that technology-based learning yields better learning outcomes than conventional methods. Cahyani et al. (2025) also explain that easy access to technology impacts students' creativity and their ability to generate new ideas in learning. Jakaria (2024) emphasised that the use of TPACK-based teaching materials influences students' learning outcomes. This research shows that the TPACK-based media innovation developed and applied by teachers in flora ornament drawing learning is proven effective. The media was comprehensively designed to cover stages in mastering flora drawing, from introducing flora ornament drawing, basic drawing techniques, to coloring flora ornament drawings.

Students' ability to draw floral ornaments is assessed based on the following criteria:

1. Idea, this criterion evaluates originality, novelty, appeal, depth of meaning, and the harmony presented in the floral ornament drawing. It is not merely about copying existing objects but about how students present perspectives, interpretations, or unique stories as expressions of their individuality and critical thinking about the object being drawn.
2. Creativity of form, this criterion assesses the exploration of the transformation of basic floral forms, innovation in repetition and variation of elements, the result of form transformation, clarity of shape/visuals, and the design principles applied in the floral ornament drawing. This criterion provides a more specific picture of how students develop and transform basic floral shapes into creative ornaments.
3. Colour composition, this criterion evaluates the appropriateness of colours, colour harmony, balance, contrast, and unity of colour, all integrated within the context of floral ornament drawing.

4. Technique: This criterion evaluates students' skills in applying various techniques in floral ornament drawing. The assessment covers the use of tools/materials, mastery of lines, coloring techniques, innovation/diversity of techniques, and the creation of artistic patterns in floral ornament drawings.
5. Neatness: This criterion assesses the precision of lines, neatness in colouring, attention to detail, neatness in shading/grading, and overall visual cleanliness of the floral ornament drawing. Neatness reflects the precision and quality of the final drawing.

Student works in floral ornament drawing are assessed using a scoring scale from 1 to 5 for each criterion, with a maximum score of 25 for all criteria per artwork. The evaluation categories are based on the following score intervals.

**Table 1.** Evaluation Categories Based on Score Intervals

Score Interval	Category
91 – 100	Excellent
81 – 90	Good
71 – 80	Satisfactory
61 – 70	Pair
0 – 60	Very Poor

The following are the differences in the evaluation results of the flora ornament drawing works by students at SMP Negeri 3 Pattalassang in the experimental and control classes:

**Table 2.** Flora Ornament Drawing Assessment Results

Artwork No	Assessment Criteria for the Experimental Class					$\Sigma$	Score	Assessment Criteria for the Control Class					$\Sigma$	Score
	1	2	3	4	5			1	2	3	4	5		
1	3	3	4	5	5	20	80	2	2	2	3	3	12	48
2	5	5	5	5	4	24	96	2	2	2	3	3	12	48
3	4	5	3	5	4	21	84	4	4	3	4	4	19	76
4	4	4	5	5	5	23	92	3	3	2	3	2	13	52
5	5	4	5	5	5	24	96	2	2	3	3	2	12	48
6	5	4	4	4	5	22	88	4	4	4	4	4	20	80
7	5	5	5	5	4	24	96	4	4	3	3	4	18	72
8	4	4	5	5	5	23	92	4	4	3	3	3	17	68
9	3	5	4	4	5	21	84	4	3	3	4	4	18	72
10	5	5	5	5	4	24	96	4	4	4	4	3	19	76
11	5	5	4	5	4	23	92	4	3	3	4	3	17	68
12	5	4	5	4	5	23	92	3	3	4	4	3	17	68
13	5	5	5	4	5	24	96	3	4	3	4	4	18	72
14	4	5	5	5	5	24	96	2	3	2	2	3	12	48
15	3	5	3	4	5	20	80	3	3	3	4	4	17	68
16	5	5	4	5	5	24	96	4	4	3	3	3	17	68
Average	4.4	4.6	4.4	4.7	4.7	22.8	91	3.3	3.3	2.9	3.4	3.3	16.1	64.5

Based on the evaluation data of the flora ornament drawing works by students at SMP Negeri 3 Pattalassang in the experimental class, which used TPACK (Technological Pedagogical Content Knowledge)-based media for flora ornament drawing, the results were excellent in every assessment criterion. This reflects that the integration of technology in the learning media helped students in the

process of drawing flora ornaments, resulting in works with accurate lines, neat coloring, detail, neat shading/graduation, and a clean presentation.

**Table 3.** Descriptive Statistics of Student Scores

Class	N	Mean	Std Dev
Experiment	16	91.0	5.93
Control	16	64.5	11.49

The results of the study show that the use of TPACK-based learning media has a significant impact on students' ability to draw flora ornaments. Descriptively, the average score of the experimental class reached 91 (categorized as very good), much higher than the control class, which only obtained an average of 64.5 (categorized as poor). This difference is not only seen in the final scores but is also consistent across every assessment aspect, such as idea, creativity of form, color composition, technique, and neatness.

**Table 4.** Results of Independent Samples t-test

Component	Value
Mean Experimental	91.0
Mean Control	64.5
t-value	8.197
Df	30
p-value	< 0.0001
Conclusion	Significant difference

The results of the independent samples t-test show that the difference between the two groups is highly significant ( $t = 8.20$ ;  $p < 0.0001$ ). The effect size (Cohen's  $d = 2.84$ ) indicates that TPACK-based media has a very strong effect on improving students' performance. Such a large effect size demonstrates that this learning media not only provides a slight difference but also leads to substantial changes in the quality of the flora ornament drawings produced by students at SMP Negeri 3 Pattalassang.

### 3.2 Discussion

From a pedagogical perspective, the integration of technology, pedagogy, and content in TPACK-based media provides visual stimuli, procedural structure, and learning flexibility that were not available in the control class. The media also allows students to better understand the stages of drawing, from exploring ideas, transforming floral forms, choosing colours, to mastering techniques. These findings align with (Rahmawati et al., 2024), who assert that the integration of technology in learning can support students in achieving desired learning outcomes. Students can explore various dynamic visual inspirations with the support of a learning environment that stimulates critical thinking, allowing them to explore ideas, confidently transform floral shapes, combine colors, and master techniques and neatness in their artwork, ultimately producing high-quality work. (Hardanti et al., 2024) also explain that the easy access to TPACK-based learning media through various devices can support flexible, self-directed learning for students.

In contrast, the control class showed less optimal results. The absence of visual and procedural media caused students to struggle with developing ideas, determining color composition, and applying techniques correctly. This was reflected in the absence of any students in the control group achieving the "good" or "very good" categories. Overall, the findings of this study reinforce that TPACK integration is a highly effective learning strategy for improving flora ornament drawing skills. This media not only enhances technical and aesthetic aspects but also stimulates creativity and a deeper understanding of visual arts concepts, particularly in flora drawing.

These research findings are in line with constructivist theory, which emphasizes that knowledge is built through students' experiences and active interactions (Masgumelar & Mustafa, 2021). Through TPACK-based media, students have the opportunity to learn by doing, experiment with visual ideas, and receive immediate feedback from both teachers and digital media. Heinich et al. (1996:17) emphasize that this learning theory focuses on students' direct experiences, not just cognitive aspects. The constructivist approach encourages students to be creative and active in the learning process, not merely passive receivers of information. This activity strengthens the meaning-making process and enhances students' sense of ownership over their work. Albert Bandura highlights the importance of observational learning, which involves four stages: attention, retention, reproduction, and motivation to repeat (Warini et al., 2023). Digital media allows for greater collaboration among students and richer visual communication, thereby strengthening the social aspects of learning in the arts.

This study has several limitations that need to be considered. First, the relatively small sample size (16 students per group) limits the generalization of the results to a larger population. Second, the short duration of the intervention (one learning cycle) may not fully reflect the long-term effects of TPACK implementation. Third, potential teaching bias could occur since the same teacher taught both the experimental and control groups, which means the difference in treatment might not have been fully controlled.

Nevertheless, the results of this study still make an important contribution, showing that TPACK-based media innovation has strong potential to improve flora ornament drawing skills while fostering creativity and ecological awareness in students.

#### 4. CONCLUSION

In conclusion, this study demonstrates that the use of TPACK (Technological Pedagogical Content Knowledge)-based learning media significantly enhances students' ability to draw flora ornaments by fostering interactive and reflective visual arts learning that promotes creativity and critical thinking through the integration of technological, pedagogical, and content knowledge. Despite these positive findings, the research is limited by its relatively short implementation period and a restricted sample scope, which may limit the generalizability of the results across different educational and cultural contexts. Therefore, future research is recommended to employ longitudinal designs with larger and more diverse samples, as well as to explore the development and integration of AI-assisted drawing tools to further enrich digital visual arts learning. Overall, this study contributes to the advancement of technology-based art pedagogy aligned with the demands of 21st-century education.

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