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DEVELOPMENT OF DIGITAL VISUAL INTERACTIVE LEARNING MEDIA FOR COLOR THEORY AND COMPOSITION

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ABSTRACT

This study investigated the effectiveness of interactive digital visual-based learning media in improving students' understanding of color theory and composition in graphic design education. Using a Classroom Action Research (CAR) approach based on Outcome-Based Education (OBE) and Student-Centered Learning (SCL), the study was conducted in two cycles. The results showed significant improvements in student participation, learning achievement, visual creativity, and design analysis skills. The implementation of the media also enhanced students' abilities to analyze, evaluate, and create design works based on color theory. Overall, interactive digital visual-based learning media proved effective in developing students' Higher Order Thinking Skills (HOTS), particularly at the levels of analysis, evaluation, and creation.

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INTRODUCTION

The development of digital technology, artificial intelligence, interactive multimedia, and the creative industry has shifted the paradigm of graphic design education to become more dynamic, visual, collaborative, and digitally driven. Today's graphic design education is no longer solely focused on mastering design software, but also emphasizes visual thinking, creativity, visual communication, problem-solving, and critical thinking skills in students to produce communicative and innovative visual works (Lupton, 2021).

In the context of visual communication design, color is one of the most important visual elements due to its ability to build nonverbal communication quickly and effectively. Color functions not only as an aesthetic element but also as a visual communication medium capable of influencing the audience's emotions, perceptions, behaviors, and decisions regarding a visual design (Kaya & Epps, 2020). Color also plays a role in establishing branding, visual hierarchy, design readability, and the user's emotional experience in digital media (Carollina et al., 2023).

Itten (2020) explains that color has expressive power that can create emotional atmosphere and strengthen visual communication messages. In modern visual communication design, understanding color theory is a fundamental competency that graphic design students must possess because it is related to the effectiveness of visual communication in digital media, branding, advertising, user interfaces, interactive multimedia, and promotional design.

In the Color Theory and Composition course at the Graphic Design Study Program at the University of Science Indonesia, students learn various basic concepts of color theory such as the color wheel, primary, secondary, and tertiary colors, hue, tint, tone, shade, color harmony, color psychology, warm and cool colors, visual hierarchy, and the application of color in digital visual communication design. This material forms the basis for developing visual design projects such as branding, poster design, UI/UX, social media, digital illustration, and interactive multimedia.

However, based on initial observations of the learning process, several issues were still identified that impacted the quality of student learning. Students tended to have difficulty understanding the abstract concepts of color theory, particularly in connecting color psychology with audience visual perception and the implementation of color in visual communication design. The predominantly lecture-based learning method resulted in students being less active in visual exploration and less engaged in creative, project-based visual learning.

In addition, some students still experience difficulties in:

1. determine harmonious color combinations,
2. understand the relationship between colors and emotions,
3. evaluate the effectiveness of color in visual design,
4. building a visual hierarchy,
5. applying color theory in branding and digital media.

In fact, the implementation of Outcome Based Education (OBE) and Student Centered Learning (SCL) requires a learning process that:

1. student-centered,
2. experiential learning based,
3. encourage creativity,
4. improve visual analysis skills,
5. developing HOTS,
6. produce measurable learning outcomes (Hidayat & Khotimah, 2021).

In modern graphic design instruction, students require a more visual, interactive, exploratory, and contextual learning experience to develop a deep and applicable understanding of color theory. Therefore, the use of interactive, digital visual-based learning media is a relevant solution for improving the quality of color theory and composition instruction. Interactive learning media allows students to directly engage in visual simulations, explore color combinations, analyze color psychology, evaluate visual designs, and develop design projects based on color theory. Research shows that interactive visual media can increase student motivation, visual creativity, engagement, and visual problem-solving skills (Lestari & Prasetyo, 2021).

Research by Kaya and Epps (2020) shows that color has a significant relationship with human emotions and perception. Research by Wang (2022) also shows that the combination of color psychology in visual communication design influences consumer psychological needs and the effectiveness of visual communication. González-Martín et al. (2022) explain that the use of color in digital visuals can build emotional experiences and strengthen the effectiveness of digital visual communication.

Based on these conditions, this research was conducted to develop interactive digital visual-based learning media to improve understanding of color theory and composition in the Color Theory and Composition course in the Graphic Design Study Program, Universitas Sains Indonesia.

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RESEARCH METHODS

This research employed Classroom Action Research (CAR) with a mixed methods approach, combining quantitative and qualitative approaches. The research was conducted using the Kemmis and McTaggart model, which consists of four main stages:

1. planning,
2. implementation of actions,
3. observation,
4. reflection.

The learning approaches used in this research are Outcome-Based Education (OBE) and Student-Centered Learning (SCL). Learning is designed based on:

1. Case Based Learning,
2. Project Based Learning,
3. visual exploration,
4. collaborative learning,
5. and visual problem solving.

The research subjects were students of the Graphic Design Study Program at the University of Science Indonesia who took the Color Theory and Composition course in the Even Academic Year 2025/2026. The research was conducted in two learning cycles using interactive digital visual-based learning media. The learning media used included:

1. digital color wheel simulation,
2. interactive multimedia,
3. visual moodboard,
4. visual learning videos,
5. design case studies,
6. digital color exploration,
7. and visual communication design projects.

Data collection techniques are carried out through:

1. observation of student activities,
2. learning outcome test,
3. learning documentation,
4. design project assessment,
5. student response questionnaire,
6. short interview,
7. visual presentation assessment.

Data were analyzed using quantitative and qualitative descriptive approaches to determine:

1. increased understanding of color theory,
2. increased visual creativity,
3. student involvement,
4. effectiveness of interactive learning media,
5. and the achievement of OBE-based CPMK.

RESEARCH RESULTS AND DISCUSSION

Research Results

This classroom action research was conducted in the Color Theory and Composition course in the Graphic Design Study Program at the University of Science Indonesia for the 2025/2026

Academic Year. The research was conducted in two cycles using the Outcome-Based Education (OBE) and Student-Centered Learning (SCL) approaches through the application of interactive digital visual-based learning media.

The research aims to improve:
1. understanding color theory,
2. students' visual creativity,
3. design analysis skills,
4. active involvement of students in learning.

Research success indicators are determined based on:
1. improving student learning outcomes,
2. increased learning activities,
3. increased visual creativity,
4. CPMK achievement,
5. student involvement in SCL-based learning.

Results of Cycle I

a. Planning Stage

At this stage the lecturer prepares:
1. OBE-based RPS,
2. digital visual interactive learning media,
3. Student Worksheet (LKM),
4. observation instruments,
5. HOTS assessment rubric,
6. color design case study.

Learning materials in Cycle I include:
1. Understanding of color,
2. Color wheel,
3. Color psychology,
4. The function of color in visual communication.

b. Implementation Stage

Learning is carried out using:
1. visual color wheel simulation,
2. interactive multimedia,
3. visual poster analysis,
4. group discussion,
5. digital color exploration.

Students do:
1. Color analysis in poster design,
2. Color psychology identification,
3. Color combination evaluation,
4. Presentation of discussion results.

c. Results of Observations of Student Activities in Cycle I

The following is a table of Cycle I Student Activities:

Table 1. Student Activities in Cycle I

No	Activity Aspects	Number of Active Students	Percentage
1	Group discussion	22	68.75%
2	Visual analysis	20	62.50%
3	Design presentation	18	56.25%
4	Question and answer	19	59.37%
5	Interactive media exploration	24	75.00%

Activity Percentage Calculation

Formula:

$$Persentase = \frac{Jumlah\ Mahasiswa\ Aktif}{Jumlah\ Mahasiswa} \times 100\%$$

Example:

$$Persentase = \frac{22}{32} \times 100\% = 68.75\%$$

Based on observations, student activity in Cycle I showed increased student engagement in interactive visual learning. However, some students still experienced difficulties in:

1. understand the relationship between colors and emotions,
2. determine harmonious color combinations,
3. building a visual hierarchy.

d. Student Learning Outcomes in Cycle I

The following is a table of the results of the Cycle I Cognitive Test:

Table 2. Results of Cycle I Cognitive Test

No	Value Category	Number of Students	Percentage
1	Very Good (85–100)	6	18.75%
2	Good (75–84)	12	37.50%
3	Enough (65–74)	9	28.12%
4	Less (<65)	5	15.63%

Learning Completion Calculation

$$Ketuntasan = \frac{Jumlah\ Mahasiswa\ Tuntas}{Jumlah\ Mahasiswa} \times 100\%$$

$$Ketuntasan = \frac{18}{32} \times 100\% = 56.25\%$$

These results show that learning completion in Cycle I was still below the research target, namely 80%.

e. Cycle I Reflection

Based on the results of learning observations and evaluations, several obstacles were found:

1. students are not yet accustomed to using interactive visual media,
2. some students are still passive in discussions,
3. visual analysis skills are still low,
4. Students still have difficulty understanding color psychology.

Therefore, in Cycle II improvements were made by:

1. increase collaborative learning activities,
2. increase visual design case studies,
3. enhance digital color exploration practices,
4. provide visual communication based design projects.

Results of Cycle II

1. Planning Stage

In Cycle II, lecturers improved the learning process by:

1. adding visual branding case studies,
2. increase digital color simulation,
3. using project based learning,
4. increase presentation activities and critique of work.

Learning materials include:

1. color harmony,
2. visual hierarchy,
3. visual branding,
4. design composition,
5. color psychology in digital media.

2. Implementation Stage

Students do:

1. exploration of color combinations,
2. visual branding analysis,
3. design project development,
4. presentation of visual works,
5. group design critique.

Learning is carried out using:

1. Canva,
2. Adobe Color,
3. digital moodboard,
4. visual interactive multimedia.

3. Results of Observations of Student Activities in Cycle II

The following is a table of Cycle II Student Activities:

Table 3. Student Activities in Cycle II

No	Activity Aspects	Number of Active Students	Percentage
1	Group discussion	29	90.62%
2	Visual analysis	28	87.50%

3	Design presentation	27	84.37%
4	Question and answer	26	81.25%
5	Interactive media exploration	31	96.87%

Activity Percentage Calculation

$$Persentase = \frac{29}{32} \times 100\% = 90.62\%$$

The observation results showed a significant increase in students' active involvement in SCL-based learning.

4. Student Learning Outcomes in Cycle II

The following is a table of the results of the Cycle II Cognitive Test:

Table 4. Results of Cycle II Cognitive Test

No	Value Category	Number of Students	Percentage
1	Very Good (85–100)	15	46.87%
2	Good (75–84)	12	37.50%
3	Enough (65–74)	4	12.50%
4	Less (<65)	1	3.13%

Learning Completion Calculation

$$Ketuntasan = \frac{27}{32} \times 100\% = 84.37\%$$

These results show that the learning completion target has been achieved.

5. IMPROVING LEARNING OUTCOMES

The following is a table comparing learning outcomes for Cycle I and Cycle II:

Table 5. Comparison of Learning Outcomes in Cycle I and Cycle II

Aspect	Cycle I	Cycle II	Improvement
Student Activities	64.37%	88.12%	23.75%
Learning Completion	56.25%	84.37%	28.12%
Visual Creativity	65.62%	87.50%	21.88%
Design Analysis Skills	62.50%	85.93%	23.43%

Increase Calculation

$$Peningkatan = Nilai\ Siklus\ II - Nilai\ Siklus\ I$$

$$84.37\% - 56.25\% = 28.12\%$$

DISCUSSION

The research results show that the use of interactive digital visual-based learning media has a positive impact on the learning process in the Color Theory and Composition course. The application of interactive media can improve students' understanding of color theory, visual creativity, design analysis skills, and active student engagement in Outcome-Based Education (OBE) and Student-Centered Learning (SCL)-based learning.

This improvement occurred because students received a more visual, exploratory, and contextual learning experience compared to conventional learning. During the learning process, students not only received theoretical material but also directly engaged in various visual activities such as digital color simulations, design project development, visual design case study analysis, collaborative learning, and interactive digital media exploration. These activities helped students understand the relationship between color theory, color psychology, visual perception, and their application in visual communication in greater depth.

The use of digital visual simulations allows students to directly explore the relationships between colors through the color wheel, color harmony, and color combinations in visual design. Through these activities, students more easily understand how color can influence emotions, establish visual hierarchies, and strengthen visual communication messages in a design. Furthermore, project-based design learning also encourages students to develop visual creativity and problem-solving skills in producing visual communication design work.

Case study-based and collaborative learning contribute to increased student engagement in the learning process. Students become more active in visual discussions, design presentations, work evaluations, and group design critiques. These activities help students develop critical thinking and visual analysis skills in evaluating the effectiveness of color use in visual communication media.

The results of this study support the research of Kaya and Epps (2020), which explains that color has a significant relationship to human emotional perception. Color is not only understood as an aesthetic element but also has a strong psychological influence on the emotions, behavior, and visual perception of audiences. Therefore, understanding color theory is a crucial competency in visual communication design education.

Furthermore, the results of this study align with research by Mulyadi and Rahmawati (2023), which showed that interactive learning media can increase student engagement in visual design learning. The use of interactive visual media makes the learning process more engaging, dynamic, and communicative, enabling students to participate more actively in the learning process.

The implementation of OBE and Student-Centered Learning in this study also proved effective in improving students' Higher Order Thinking Skills (HOTS) at levels C4 (Analyze), C5 (Evaluate), and C6 (Create). Students not only understood color theory conceptually, but were also able to analyze visual designs based on color psychology and visual hierarchy, evaluate the effectiveness of color use in visual communication, and create design projects based on color theory and composition.

Students' ability to create visual works demonstrates that the learning process is not solely focused on mastering theory but also on practical skills and developing visual creativity. Students become better able to connect color theory to the needs of modern visual communication, such as branding, social media, digital posters, UI/UX, and visual promotional design.

Thus, interactive learning media based on digital visuals has been proven to be effective in modern graphic design learning based on Outcome Based Education (OBE) and Student Centered Learning (SCL). The use of interactive visual media not only improves the understanding of color theory, but also improves visual creativity, design analysis skills, active student involvement, and higher-order thinking skills in learning visual communication design.
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CONCLUSION

Based on the research results, it can be concluded that the use of interactive digital visual-based learning media can improve the quality of learning in the Color Theory and Composition course in the Graphic Design Study Program, Universitas Sains Indonesia.

The use of interactive visual media is able to:

1. improve understanding of color theory,
2. enhance visual creativity,
3. improve design analysis skills,
4. increase active student involvement,
5. support the implementation of OBE-based learning and Student Centered Learning.

Interactive visual learning is also effective in supporting HOTS-based learning through visual exploration activities, design evaluations, and visual communication design projects based on color theory and composition.

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