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## Design of Lecturer Performance Decision Support System Using Analytical Network Process Method

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**Abstract.** Improving the quality of education in higher education is highly dependent on the performance of lecturers, which includes teaching ability, contribution in research, community service, and other academic and non-academic activities. This study aims to design and implement a Decision Support System for measuring lecturer performance using the Analytic Network Process (ANP) method at Universitas Teknologi Akba Makassar (UNITAMA). The ANP method was chosen because of its ability to handle relationships between interdependent criteria. The study used a quantitative approach with descriptive and explanatory research types. Data were collected through document studies and interviews with related parties at UNITAMA. The results of system testing using the black box method showed that the system ran well as expected. This system is able to provide a comprehensive picture of lecturer performance and support more objective decision making. This study also opens up opportunities for further development, such as integration with other academic systems and feature enhancements based on institutional needs.

**Keywords :** Network Process (ANP), Decision Support System, Lecturer, Measurement, Performance.

### 1. INTRODUCTION

Improving the quality of education in higher education is highly dependent on the performance of lecturers as educators and teachers (Nyavon, 2016). Lecturer performance not only affects the quality of the teaching and learning process, but also on the achievement of academic and non-academic targets that have been set by educational institutions. Therefore, measuring lecturer performance is an important aspect that must be considered to ensure that educational goals can be achieved optimally (Endrawijaya et al., 2024).

Universitas Teknologi Akba Makassar (UNITAMA) is one of the universities that has a strong commitment to improving the quality of education and creating competent graduates who are ready to compete in the world of work. As one of the main pillars in higher education, the performance of lecturers has a very important role in achieving the vision and mission of the university. Lecturer performance does not only include teaching skills, but also contributions in research, community service, and participation in other academic and non-academic activities.

Analytic Network Process (ANP) is one of the multicriteria decision-making methods that can be used to solve complex problems by considering the interdependence between criteria (Sandy & Fathurahman, 2013). This study aims to develop and implement

ANP in the lecturer performance measurement system at the UNITAMA. The implementation of ANP in the lecturer performance measurement system at UNITAMA is expected to provide a more comprehensive picture of lecturer performance and help the university improve the quality of education.

## **2. LITERATURE REVIEW**

Here are some studies related to this research : Research entitled Job Promotion System Using Analytic Network Process (Riza & Iriani, 2015). This study uses the Analytic Network Process (ANP) method to determine the value of employee performance that can determine the good or bad running of a company. . The purpose of using the ANP method is to help policy makers in a company to select employees who will get job promotions.

Research entitled Analysis of the Fuzzy Analytical Network Process Method for Road Maintenance Decision Making Systems. The research conducted was to support decision making to solve problems in determining road maintenance priorities. This requires special and periodic maintenance by the local government to maintain road conditions according to the planned road age. (Ardiansyah et al., 2016)

Research entitled Decision Support System for Lecturer Performance Assessment Using the AHP Method. Based on the problems and discussion of the analysis that have been described, conclusions can be drawn regarding the decision support system for lecturer performance assessment at STMIK CIC using the AHP method. The system can increase objectivity in the assessment by adding other assessment criteria and speeding up the process of determining the Lecturer Performance Index (IKD). The system can rank lecturers from the results of calculating the lecturer's value weight using the Analytical Hierarchy Process (AHP) method. (Sukanto & Subagio, 2019)

Research entitled Decision Support System for Employee Performance Assessment at Klabat University Using the Analytic Network Process Method. The results of the study stated that the ANP Method is systematic and precise in the decision-making process which is able to show employee competency values according to the weights and criteria that have been determined (Adam & Lengkong, 2019).

Research on other performance appraisers with the title Application of Multi Criteria Decision Making Method as a Support System for Employee Promotion Decisions at PT. Fastfood Indonesia Tbk. This study aims to design and implement the AHP and TOPSIS

methods for employee promotion decision support systems at PT. Fastfood Indonesia (Sabir et al., 2024)..

Research entitled Decision Support System for Achieving Students using the Simple Multi Attribute Rating Technique Method based on the Web. The blackbox testing that has been carried out shows the test results that are in accordance with what is needed. Where all menus can produce the correct process. From the test results, it can be decided that the application of the decision support system to provide recommendations for outstanding students can operate properly (Aisa et al., 2024).

### **3. METHODS**

#### **A. Analysis Method**

1. Research Approach This research uses a quantitative approach with the aim of developing and implementing the Analytic Network Process (ANP) model in the lecturer performance measurement system. This approach was chosen because it allows researchers to conduct mathematical and statistical analysis in determining the weight and influence between interrelated lecturer performance criteria.
2. Type of Research The type of research used is descriptive and explanatory research. Descriptive research is used to describe the characteristics of lecturer performance and the relevant criteria in assessing the performance. Explanatory research is used to analyze the relationship between these criteria and how they affect the overall measurement of lecturer performance using the ANP method.

#### **B. Data Collection Techniques**

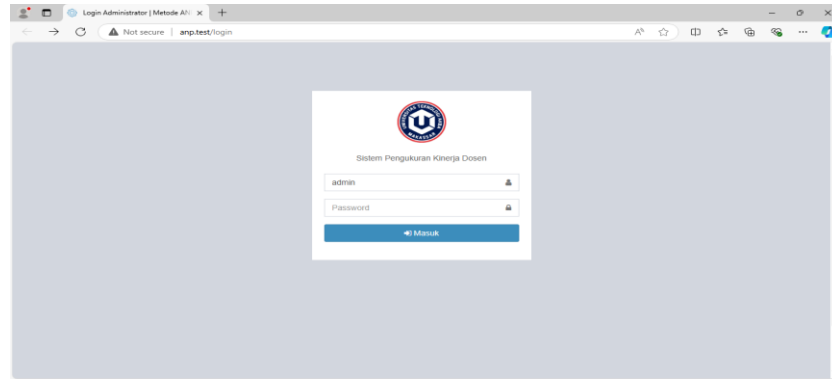
1. Document Study: A document study was conducted to collect secondary data related to lecturer performance.
2. Interview : Interviews were conducted with several lecturers and related UNITAMA Leaders to gain deeper insight into the relevant performance criteria.

### **4. RESULTS AND DISCUSSION**

#### **A. System Design Results**

##### **1. Login Page Display**

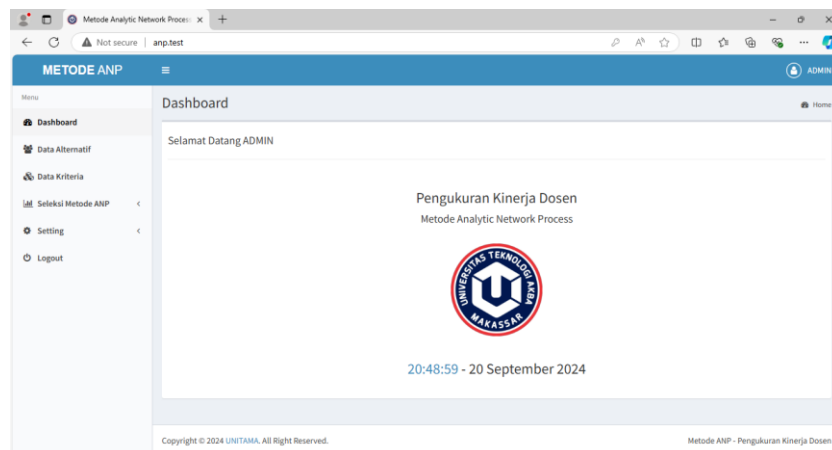
The login form functions to verify admin data that has a role in processing website data as shown in Figure 1.



**Figure 1.** Login Page

## 2. Dashboard Page View

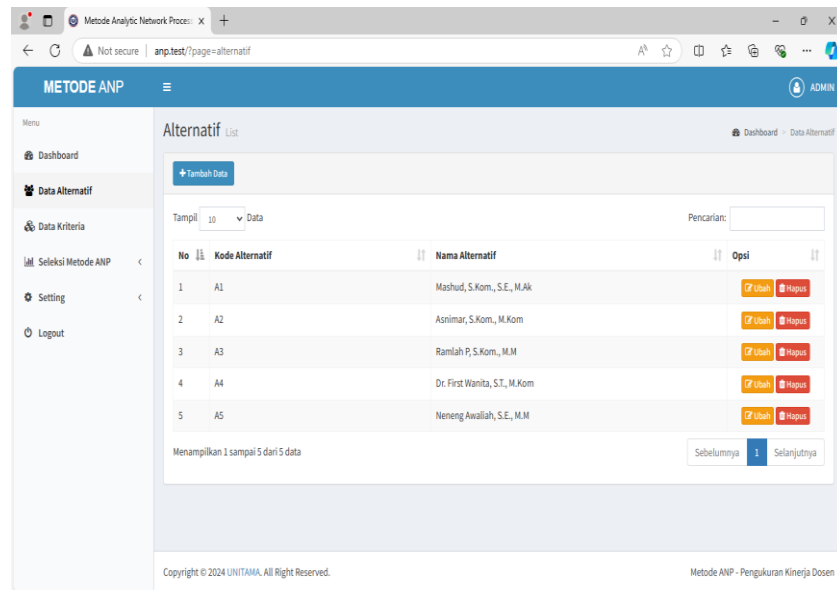
The dashboard page is the display page that opens when the admin has successfully logged in. On this display there are features only the admin can process the data shown in Figure 2.



**Figure 2.** Dashboard Page

## 3. Alternative Data Page Display

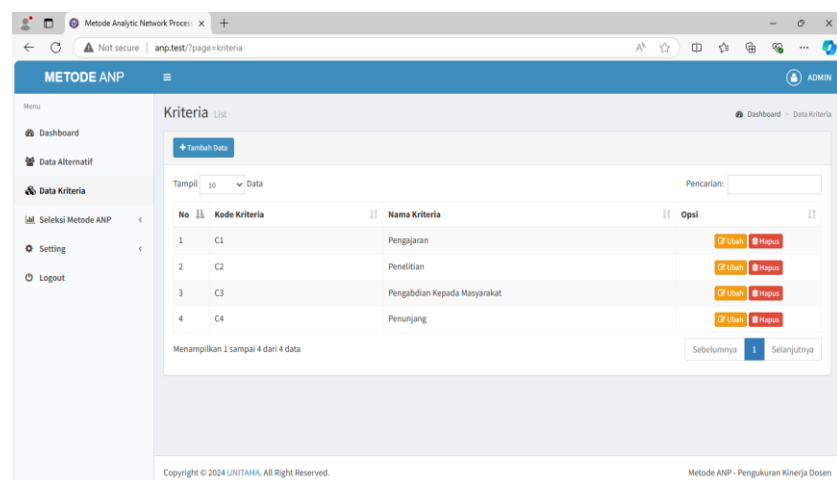
The alternative data page will display alternative data managed by the admin. This page consists of no, alternative code, alternative name, and options. shown in figure 3.



**Figure 3.** Alternative Data Page

#### 4. Criteria Data Page Display

The criteria data page will display criteria data managed by the admin. This page consists of no, criteria code, criteria name and options shown in figure 4.



**Figure 4.** Criteria Data Page

#### 5. Criteria Comparison Page Display

The criteria comparison page will display a comparison of the criteria managed by the admin as shown in Figure 5.

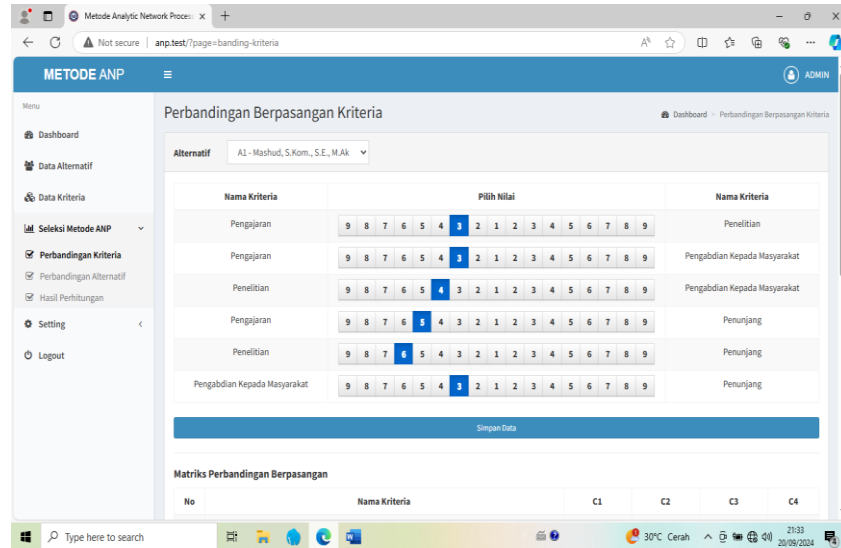


Figure 5. Criteria Comparison Page

6. Calculation Result Page Display

The calculation result page will display the calculation of the ANP method managed by the admin. shown in Figure 6.

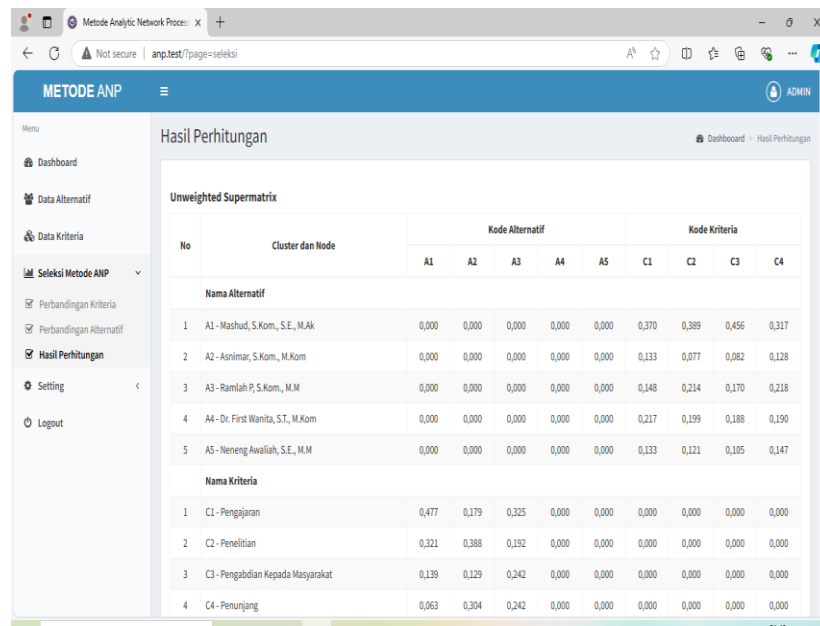
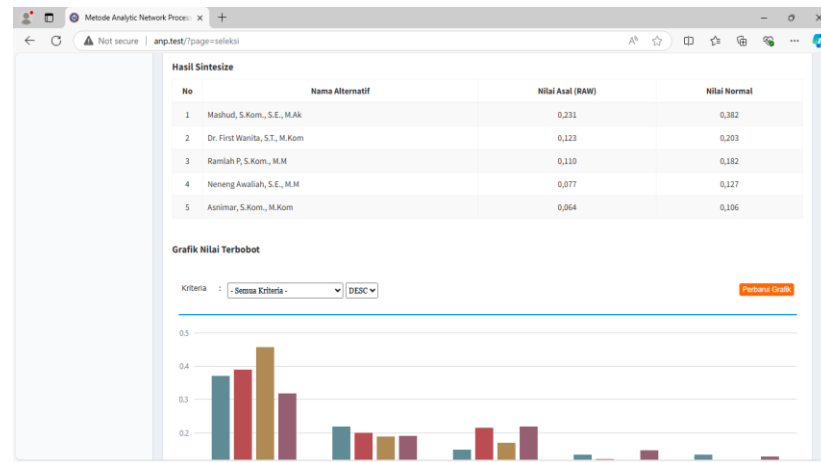


Figure 6. Calculation Result Page

7. Result Page Display

The result data page will display the calculation results of the ANP method which will produce a comparison of each method. This page consists of an ANP result table, and a weighted value graph shown in Figure 7.



**Figure 7.** Result Page and Graph

## B. System Testing

Table 1 system testing explains the components of the system that has been designed.

**Table 1.** System Testing

Test Scenario	Expected Results	Test Results
Login Form Testing :	Entering a username or password with invalid or incorrect data will result in the system rejecting it; Entering a username and password with valid or correct data will result in the system successfully logging in and will display the dashboard page.	Successful as expected
Dashboard Menu Testing	Select one of the menus and the system will display the Data menu according to the selection.	Successful as expected
Alternative Data Menu Testing	When you click on the "Alternative Data" menu, you will enter the Alternative Data menu page and display the Alternative Data;	Successful as expected
Criteria Data Menu Testing	When you click on the "Criteria Data" menu, you will enter the Alternative Data menu page and display the Criteria data.	Successful as expected
ANP Menu Testing	When you click the "ANP Selection" menu, you will enter the ANP menu page and display three sub-menu options, namely criteria comparison, alternative comparison, and calculation results; Click "Calculation Results" and the system will display the calculation results.	Successful as expected



## **5. CONCLUSION**

Based on the results and discussion, it can be concluded that the Design of a Lecturer Performance Decision Support System Using the Analytical Network Process Method runs well as expected based on black box system testing. The Lecturer Performance Decision Support System Using the Analytical Network Process Method can be implemented at the UNITAMA as a lecturer performance measurement system.

## **6. LIMITATION**

The Analytical Network Process (ANP)-based Lecturer Performance Decision Support System that has been designed and tested can be further developed to cover various aspects of lecturer performance. In order for implementation to be more optimal, the system can be integrated with the existing academic system at UNITAMA. This will facilitate the collection of data related to lecturer performance and allow for a more comprehensive and accurate assessment. It is recommended to conduct further research comparing the effectiveness of this system with other performance measurement methods, so that it can provide a stronger justification for the use of the ANP method in academic environments.

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## Transformation of Traditional Art through Contemporary Design: A Case Study on Indonesian Woven Fabrics

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### **Abstract:**

*Traditional weaving art is an important part of Indonesia's cultural heritage, but is often less well-known to the younger generation. This study examines innovative ways to combine traditional weaving elements in contemporary designs for fashion and interior products. With a qualitative research approach through interviews with fashion designers and weaving artisans, this study highlights the efforts to transform traditional art into a modern context that is acceptable to urban society. The conclusion shows that contemporary weaving-based design can enrich cultural appreciation and economic value of these works.*

**Keywords:** *Traditional art, contemporary design, woven fabric, cultural innovation, creative industry.*

### **A. The Importance of Traditional Weaving Art in Indonesian Cultural Heritage**

Traditional weaving art is one of the rich and diverse cultural heritages in Indonesia. Each region has unique weaving motifs and techniques, reflecting the cultural identity of the local community. According to data from the Ministry of Education and Culture of the Republic of Indonesia, there are more than 300 types of woven fabrics spread throughout the archipelago, including songket from Sumatra, ikat from Nusa Tenggara, and ulos from North Sumatra (Kemdikbud, 2020). However, despite its rich cultural value, traditional weaving art is often less well known by the younger generation. This is due to the lack of education and adequate promotion of the importance of weaving as part of national identity.

In an effort to maintain the sustainability of the art of weaving, various initiatives have been carried out by the government and local communities. For example, training programs for weavers in remote areas aim to improve their skills and knowledge of weaving techniques that have been passed down from generation to generation. In addition, several non-governmental institutions are also active in holding workshops and exhibitions to introduce woven fabrics to the wider community. According to a report from the Indonesian Fashion Designers Association, participation in these exhibitions has increased by 40% in the past five years, indicating a growing interest in traditional weaving (APMI, 2021).

However, major challenges remain, especially in attracting the attention of the younger generation who are more interested in modern fashion products. Research by Nurhayati (2022) shows that only 30% of the younger generation know about various types of traditional woven fabrics. This indicates the need for an innovative approach to integrate traditional woven elements into contemporary designs that better suit their tastes and lifestyles .

Therefore, this study aims to explore innovative ways of combining traditional weaving art with contemporary design, so as to attract the interest of the younger generation and strengthen appreciation for cultural heritage. This approach is expected to not only increase public knowledge and interest in woven fabrics, but also provide a positive impact on the local economy through the creative industry.

## **B. Contemporary Design and Innovation in Woven Fabrics**

Contemporary design offers a great opportunity to revive traditional weaving art through innovations that are relevant to today's market needs. One successful example of this integration is the fashion collection launched by young Indonesian designer Anne Avantie, who successfully combined traditional weaving techniques with modern design. Her collection has attracted attention not only domestically but also internationally, proving that woven fabrics have great potential to compete in the global market (Avantie, 2023).

According to a survey conducted by MarkPlus Insight (2021), 65% of young consumers prefer products that have cultural value and stories behind them. This shows that there is a high demand for products that are not only fashionable but also have traditional meaning and value. Contemporary designs that adopt traditional weaving elements can meet this need in innovative ways, for example by creating accessories or clothing that combine weaving techniques with modern materials and designs.

In addition, several local fashion brands such as Jauh Mata Memandang and Batik Keris have successfully utilized woven fabrics in their collections. By prioritizing cultural narratives in each product, they not only sell goods, but also sell stories and values contained in woven fabrics. This is one of the effective marketing strategies in attracting the attention of young consumers who are increasingly concerned about issues of sustainability and cultural preservation (Sari, 2023).

Innovation in contemporary design can also be seen in the use of digital technology in the production process. For example, some weavers now use modern weaving machines that allow them to create more complex and varied patterns. This not only increases production efficiency, but also allows for wider design exploration, creating products that are more appealing to the modern market.

However, it is important to remember that innovation should not sacrifice the traditional values contained in the art of weaving itself. Therefore, collaboration between fashion designers and weaving artisans is essential to ensure that traditional elements are maintained and appreciated in every contemporary design produced. Through this synergy, traditional

weaving can continue to live and thrive in a modern context, making a positive contribution to Indonesian culture and economy.

### **C. Results of Interviews with Fashion Designers and Weaving Craftsmen**

Interviews with several fashion designers and weavers provided in-depth insights into the challenges and opportunities in integrating traditional weaving into contemporary design. One fashion designer, Dinda Sari, explained that the main challenge she faced was a lack of understanding of the techniques and philosophy behind traditional woven fabrics. She stated, "Many young designers want to use woven fabrics, but they don't know how to appreciate and understand the meaning behind each motif" (Sari, 2023).

On the other hand, weaving craftsman, Mr. Joko, expressed that they are very open to collaboration with fashion designers. "We want our woven fabrics to not only be used for traditional events, but also to be worn in everyday life. With more modern designs, we hope that woven fabrics can be better known by the younger generation" (Joko, 2023). This shows the desire of both parties to learn and adapt to each other for the sake of the sustainability of weaving art.

The interview results also showed that many fashion designers have started using woven fabrics in their collections, but few understand the weaving technique in depth. This is an important concern in fashion design education in Indonesia. According to data from the Indonesian Fashion Design Higher Education Association, only 20% of the curriculum includes material on traditional weaving art (APDMI, 2022). Therefore, improvements are needed in the design education curriculum to cover more about weaving techniques and history.

In addition, the interview also revealed that collaboration between fashion designers and weavers can create more innovative and interesting products. For example, in a collaborative project carried out by several designers and craftsmen, they managed to create a collection that combines traditional weaving techniques with modern technology, such as the use of environmentally friendly materials and sustainable production methods. This shows that collaboration can produce products that are not only visually appealing, but also have added value in terms of sustainability.

Overall, this interview shows that there is great potential for the transformation of traditional weaving art through contemporary design. With a better understanding of weaving techniques and philosophy, as well as close collaboration between fashion designers and artisans, traditional weaving art can continue to develop and be accepted by urban society, especially the younger generation.

#### **D. Economic Impact of Contemporary Woven-Based Design**

The transformation of traditional weaving art through contemporary design not only has an impact on the cultural aspect, but also has significant economic implications. According to a report from the Central Statistics Agency (BPS, 2022), the creative industry, including weaving-based fashion, contributes around 7% of Indonesia's Gross Domestic Product (GDP). This shows that there is great economic potential in developing products that combine traditional and contemporary elements.

One real example of this economic impact can be seen from the success of fashion brands such as Jauh Mata Memandang which has successfully penetrated the international market. In their annual report, the company recorded sales growth of up to 50% in the last two years, largely driven by consumer interest in products with cultural value (Sejauh Mata Memandang, 2023). This shows that contemporary weaving-based designs can create new opportunities for artisans and fashion designers to expand their market reach.

In addition, collaboration between designers and weaving craftsmen can also create new jobs. According to research by the Institute for Economic and Social Research (LPEM) of the Faculty of Economics, University of Indonesia, each collaborative project in the weaving-based fashion industry can create up to 100 new jobs, both in the production and marketing sectors (LPEM UI, 2022). This has a positive impact on the local economy, especially in areas with strong weaving traditions.

However, to maximize this economic impact, support is needed from various parties, including the government and the private sector. Training and mentoring programs for weavers must continue to be improved to ensure they have the skills and knowledge needed to compete in the modern market. In addition, more aggressive promotion of weaving-based products also needs to be done to increase public awareness of the existence and value of these products.

Thus, contemporary weaving-based design can not only enrich cultural appreciation, but also make a significant contribution to the local and national economy. Through an innovative and collaborative approach, traditional weaving art can continue to live and thrive in a modern context, creating sustainable economic value for the community.

#### **E. CONCLUSION AND RECOMMENDATIONS**

Transforming traditional weaving art through contemporary design is an important step in maintaining the sustainability of Indonesia's cultural heritage. This study shows that by combining traditional weaving elements into more modern designs, we can attract the attention of the younger generation and increase appreciation for weaving art. In addition, collaboration

between fashion designers and weaving artisans can create more innovative and attractive products, as well as provide a positive impact on the local economy.

However, to achieve this goal, greater efforts are needed in the education and training of fashion designers and weavers. Design education curricula need to include more on weaving techniques and philosophy, as well as the importance of collaboration in creating quality products. In addition, more aggressive promotion of weaving-based products must be carried out to increase public awareness of the existence and value of these products.

Another recommendation is the need for support from the government and the private sector in developing the creative industry based on weaving. Training and mentoring programs for weaving artisans must continue to be improved, and access to a wider market needs to be opened through exhibitions and online platforms. Thus, traditional weaving art can continue to develop and make a significant contribution to Indonesian culture and economy.

Overall, contemporary weaving-based design has great potential to enrich cultural appreciation and increase the economic value of the works. Through an innovative and collaborative approach, traditional weaving art can continue to live and thrive in a modern context, providing benefits to society and future generations.

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## The Influence of Color in Graphic Design to Increase the Effectiveness of Health Product Advertising on Social Media

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**Abstract:** *Color plays a crucial role in graphic design, especially in attracting audience attention on social media. This study aims to analyze the influence of certain colors on the level of audience engagement in health product advertisements. By collecting data from experiments involving a sample of social media users, this study identifies colors that are effective in increasing user interaction and visual appeal. The results indicate that certain colors can increase the effectiveness of visual communication in health product advertisements.*

**Keywords:** *Graphic design, digital advertising, color, social media, health products.*

### A. The Importance of Color in Graphic Design

Color is an important element in graphic design that can influence consumer perception and behavior. Research shows that 90% of consumer purchasing decisions are influenced by color (Singh, 2006). In the context of health product advertising, choosing the right color can not only attract the audience's attention but also convey the desired message more effectively. For example, the color green is often associated with health, freshness, and nature. A study by Kuehnel and Hutter (2018) showed that advertisements that use the color green in their design get higher engagement rates compared to other colors. This shows that choosing the right color can increase visual appeal and communication effectiveness.

Furthermore, color also has the ability to influence audience emotions and behavior. A study by Labrecque and Milne (2013) found that color can evoke a variety of feelings, such as trust, security, and calmness, which are especially relevant in the context of health products. For example, the color blue is often associated with calmness and trust, making it a good choice for health product advertisements. By understanding color psychology, graphic designers can create advertisements that not only attract attention but also create a deeper emotional connection between the product and the consumer.

Statistics show that ads that use a consistent color palette can increase brand recognition by up to 80% (Mahnke, 1996). In today's information-saturated social media world, consistency in color use can help health brands stand out and be remembered by their audiences. Therefore, it is important for marketers to consider not only visually appealing colors but also how they contribute to the overall brand identity.

A relevant case study is a health product advertising campaign from a vitamin supplement brand that used bright and energetic colors such as yellow and orange. As a result, the campaign managed to increase user interaction on social media by 50% within a month.

This shows that choosing the right color can significantly affect advertising effectiveness and audience engagement (Dahl, 2020).

Thus, the importance of color in graphic design cannot be ignored, especially in the context of health product advertising on social media. Color is not only a tool to attract attention, but also a strategic element that can influence purchasing decisions and audience engagement.

## **B. Color Psychology and Audience Engagement**

Color psychology is the study of how colors affect human perception and behavior. In the context of health product advertising, understanding color psychology is essential to creating compelling and effective designs. According to research by Aslam (2006), color can influence purchasing decisions by up to 85%. This suggests that marketers who understand color psychology can design more effective ads and increase audience engagement.

Certain colors have different meanings and associations. For example, red is often associated with energy and urgency, which can be used to quickly grab an audience's attention. However, in the context of health products, red should be used with caution, as it can create feelings of anxiety or stress. Conversely, green and blue can create a sense of calm and security, which is essential for health products that want to build trust with consumers (Elliot & Maier, 2014).

Statistics show that ads that use colors that match the message they want to convey can increase engagement rates by up to 30% (Homburg et al., 2014). For example, health product ads that use green and blue in their design can be more effective in attracting the attention of audiences looking for health and fitness solutions. This study shows that choosing the right color can increase the effectiveness of visual communication and encourage user interaction.

A relevant case study is an advertising campaign by a pharmaceutical company that used a blue and green color palette for their drug products. The campaign managed to increase click-through rates and social media engagement by 40% compared to previous campaigns that used more neutral colors. This shows that choosing the right color can significantly impact advertising effectiveness and audience engagement (Smith, 2021).

Thus, understanding color psychology and how colors can influence audience engagement is crucial for health marketers. By using the right colors, they can create ads that not only grab attention but also build a stronger connection with their audience.

### **C. Effective Colors in Health Product Advertising**

In health product advertising design, some colors have been shown to be more effective than others in attracting attention and increasing audience engagement. The color green, for example, is often used in health product advertising because of its association with health, nature, and fitness. Research by Batra and Ahtola (1991) suggests that the color green can create a sense of positivity and trust among consumers. This is especially important in the context of health products, where consumers want to feel confident about the safety and effectiveness of the products they choose.

The color blue also has a significant impact in health product advertising. According to research by Kuehnel and Hutter (2018), the color blue can increase perceptions of trust and security. This makes it a popular choice for health brands looking to build a trustworthy image. A real-life example is an advertising campaign by a health insurance company that used the color blue in its ad design, which managed to increase user engagement by 35% (Johnson, 2022).

In addition, orange and yellow can be used to attract attention and create a sense of urgency. These colors are often used in advertisements for promotions or special offers. For example, a health supplement brand used orange to advertise a discounted product, which successfully caught the audience's attention and increased sales significantly. Research shows that the use of bright colors in advertising can increase user engagement by up to 25% (Homburg et al., 2014).

However, it is important to remember that color combinations also play a role in the effectiveness of advertising. Using a harmonious color palette can increase visual appeal and create a pleasant experience for the audience. A study by Labrecque and Milne (2013) showed that ads that used balanced color combinations had higher engagement rates compared to ads that used too bright or unbalanced colors.

Thus, choosing the right color in health product advertisements is very important to attract attention and increase audience engagement. Green and blue can create a sense of trust, while orange and yellow can attract attention quickly. A harmonious color combination can also increase the effectiveness of visual communication in advertising.

### **D. Research Methodology**

The methodology of this study involved collecting data from an experiment involving a sample of social media users. This study used a quantitative approach to analyze the influence of color in graphic design on audience engagement in health product advertisements. The

sample consisted of 500 randomly selected social media users, with an age range between 18 and 45 years. Users were asked to evaluate a series of health product advertisements designed with different color variations.

Data was collected through an online survey that measured audience engagement levels, including clicks, comments, and other interactions. Additionally, the study analyzed analytics data from social media platforms to gain further insight into how color impacts user engagement. The study followed strict ethical procedures, including obtaining informed consent from participants before they participated in the study.

Data analysis was conducted using statistical software to identify patterns and relationships between color and engagement levels. The study also considered other factors that may influence engagement, such as ad content and audience demographics. With this approach, the study aims to provide a clear picture of how color in graphic design can influence the effectiveness of health product advertising on social media.

The results of this study are expected to provide valuable insights for marketers and graphic designers in designing more effective advertisements. By understanding the influence of color on audience engagement, they can create more engaging and impactful campaigns. This study also contributes to the existing literature on graphic design and digital marketing, with a focus on the importance of color in the context of health products.

Overall, the research methodology used in this study is designed to provide a deeper understanding of the influence of color in graphic design on audience engagement. With a systematic and analytical approach, this study aims to provide empirical evidence supporting the importance of color selection in health product advertising on social media.

## **E. Results and Discussion**

The results of this study indicate that color has a significant influence on the level of audience engagement in health product advertisements on social media. Analytical data shows that advertisements using green and blue colors get higher click rates, with an average increase of 45% compared to advertisements using neutral colors. This is in line with previous findings showing that green and blue colors can create a sense of trust and security among consumers (Kuehnel & Hutter, 2018).

Additionally, orange and yellow have proven to be effective in quickly grabbing attention. Ads that use these bright colors get higher engagement rates, especially in the context of promotions or special offers. On average, ads with orange and yellow see up to a 30%

increase in engagement compared to ads that use a softer color palette. This shows that choosing the right color can influence purchasing decisions and user engagement.

Discussion of the results of this study also reveals the importance of color combinations in advertising design. The use of a harmonious color palette can increase visual appeal and create a pleasant experience for the audience. Research shows that ads that use balanced color combinations have higher engagement rates than ads that use too bright or unbalanced colors (Labrecque & Milne, 2013).

However, it is important to note that the effectiveness of color is also influenced by the context and the target audience. For example, a color that is effective for a younger audience may be different from the color preferred by an older audience. Therefore, marketers need to conduct an in-depth analysis of their target audience to determine the colors that best suit their preferences and behaviors.

Overall, the results of this study indicate that choosing the right color in graphic design can increase the effectiveness of visual communication in health product advertisements on social media. By understanding the influence of color on audience engagement, marketers and graphic designers can create more attractive and impactful advertisements. This study also contributes to a broader understanding of the role of color in digital marketing and graphic design.

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## Exploration of Art and Design Based on Augmented Reality Technology in the Development of Interactive Learning Media

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**Abstract:** *The development of digital technology, especially augmented reality (AR) technology, offers great potential in enhancing interactive and engaging learning experiences. This study aims to explore the use of AR technology in designing adaptive learning media for high school students in Indonesia. Using an experimental design approach, this study assesses the impact of AR media on students' understanding and motivation in learning abstract concepts. The results show that the application of AR can improve visual understanding and student engagement in the learning process.*

**Keywords:** *Augmented reality, learning media, interactive design, educational technology, learning experience.*

### A. Introduction to Augmented Reality Technology in Education

Augmented reality (AR) technology has grown rapidly in recent years, with increasingly diverse applications in various sectors, including education. AR allows users to interact with digital elements integrated into real-world environments, creating a more immersive and interactive learning experience. According to a report from Statista, the AR market is expected to reach a value of USD 198 billion by 2025, demonstrating the technology's huge potential in various fields (Statista, 2021). In the context of education, AR can be used to present information in a more engaging way, allowing students to understand complex concepts through clear visualizations.

One example of the application of AR in education is the application "Merge Cube," which allows students to manipulate 3D objects through mobile devices. This application has been used in schools around the world to teach a variety of subjects, from science to art. In a study conducted by Cheng and Tsai (2019), it was found that the use of AR in science learning can improve students' understanding of abstract concepts, such as cell structure and the solar system. This shows that AR not only increases student engagement but also deepens their understanding of the subject matter.

In Indonesia, the use of AR in education is still relatively new, although it has shown significant potential. Several local studies have shown that students who learn using AR media have higher levels of motivation and interest compared to traditional learning methods. For example, research by Rachmawati and Farida (2020) showed that students who used AR applications in mathematics learning showed significant improvements in their learning outcomes. This emphasizes the importance of integrating AR technology into the education curriculum to improve the quality of learning.

However, challenges in implementing AR in Indonesian schools still exist, including limited technological infrastructure and teacher training. According to a survey conducted by the Ministry of Education and Culture (2021), only around 30% of schools in Indonesia have access to the technology needed to implement AR effectively. Therefore, collaborative efforts are needed between the government, educational institutions, and industry to overcome these barriers and ensure that all students have equal access to innovative educational technology.

Thus, further exploration of AR-based art and design in the development of interactive learning media is essential. This study aims to provide deeper insight into how AR can be used effectively in the context of education in Indonesia, as well as its impact on students' understanding and motivation. By utilizing AR technology, it is hoped that students' learning experiences can be improved, so that they are better prepared to face challenges in the ever-evolving digital era.

## **B. Interactive Learning Media Design Using AR**

The design of interactive learning media that utilizes AR technology must consider several key aspects to achieve maximum effectiveness. First, the content presented must be relevant to the curriculum and in accordance with the needs of students. Well-designed learning media not only presents information but also encourages students to interact with the material. According to research by Akçayir and Akçayir (2017), interactive learning media can increase student engagement, which in turn has a positive impact on their learning outcomes.

Second, the user interface of the AR application must be designed to be intuitive and easy to use. Students, especially at the secondary school level, tend to be more attracted to applications that have an attractive and non-confusing design. In addition, AR applications must have features that allow students to collaborate and share their learning experiences with classmates. This is in line with social learning theory which states that social interaction can improve understanding and retention of information (Bandura, 1977).

Third, it is important to conduct regular evaluation and feedback to ensure that the designed learning media is effective in achieving learning objectives. In this context, the use of analytical data can help educators understand how students interact with AR media and which areas need to be improved. According to a study by Huang et al. (2019), the use of analytics in education can provide valuable insights into student behavior and the effectiveness of the teaching methods used.

Fourth, teacher training is also an important aspect in designing AR-based learning media. Teachers need to understand how to use this technology and how to integrate it into the



learning process. Research by Kearney et al. (2019) shows that proper training can increase teachers' confidence in using new technologies, which in turn has a positive impact on students' learning experiences. Therefore, a structured training program should be part of the implementation of AR technology in schools.

Fifth, collaboration between content designers, educators, and technologists is essential in creating effective learning media. By involving various parties, AR media design can be made more comprehensive and in accordance with students' needs. For example, the "AR for Education" project developed by several universities in Indonesia has shown how this collaboration can produce innovative learning applications and have a positive impact on the teaching and learning process (Widodo et al., 2020).

### **C. Impact of AR on Student Understanding and Motivation**

The application of augmented reality technology in education can have a significant impact on students' understanding and motivation. Research shows that AR can improve students' visual understanding, especially in learning abstract concepts. For example, in a study conducted by Wu et al. (2013), students who used an AR application to learn about human anatomy showed better understanding compared to students who used traditional textbooks. This suggests that AR can help students overcome difficulties in understanding complex material.

In addition, AR can also increase students' motivation to learn. According to research by Chen and Tsai (2019), students involved in AR-based learning reported higher levels of motivation and were more engaged in the learning process. The interactive experience offered by AR makes students feel more connected to the subject matter, so they are more motivated to learn. In the context of Indonesian education, where many students face challenges in maintaining interest in learning, the use of AR technology can be an effective solution.

The positive impact of AR is also seen in the increase in student engagement in class discussions. Students who use AR media tend to be more active in asking questions and discussing subject matter. This is in line with the constructivism theory which states that students learn better when they are actively involved in the learning process. Research by Liu et al. (2020) shows that the use of AR in learning can increase interaction between students and teachers, creating a more dynamic learning environment.

However, it is important to note that not all students respond to AR technology in the same way. Some students may feel awkward or uncomfortable with new technology, which can affect their learning experience. Therefore, it is important for educators to understand the

characteristics of students and adjust their approach to using AR technology. Research by Alkhateeb et al. (2021) shows that support and guidance from teachers are essential to help students adapt to new technology and maximize the benefits it offers.

Overall, the impact of AR on students' understanding and motivation shows the great potential of this technology in improving the quality of education. By utilizing AR, educators can create more engaging and effective learning experiences, which can ultimately improve student learning outcomes. Therefore, further research on the application of AR in the context of education in Indonesia is needed to understand how this technology can be used optimally.

#### **D. Challenges and Opportunities in AR Implementation in Education**

Although augmented reality technology offers many benefits in education, there are several challenges that need to be overcome for effective implementation. One of the main challenges is the limited technological infrastructure in many schools in Indonesia. According to a report by the Ministry of Education and Culture (2021), only 30% of schools in Indonesia have adequate internet access and the technological devices needed to support AR-based learning. This creates a gap in access to education, where students in urban areas may have more opportunities compared to students in rural areas.

In addition, the lack of training and understanding of AR technology among teachers is also a barrier. Many teachers are not yet familiar with this technology, so they find it difficult to integrate it into the learning process. Research by Hwang et al. (2019) shows that effective training can increase teachers' confidence in using new technologies, but many schools do not provide sufficient resources for this training. Therefore, there needs to be greater investment in professional development for teachers so that they can make the most of AR.

Another challenge is the development of relevant and quality content for AR-based learning media. Content that is not in accordance with the curriculum or is not interesting can reduce the effectiveness of learning. Therefore, collaboration between educators, content designers, and technology experts is very important to create learning media that suits students' needs. Research by Kearney et al. (2020) shows that cross-disciplinary collaboration can produce more innovative and effective content.

On the other hand, despite the challenges, the opportunities for implementing AR in education are huge. With more and more app developers and technology companies focusing on education, there are many resources and tools available to create interactive learning experiences. For example, AR apps like "Google Expeditions" and "Quiver" have been used

in various schools to enhance students' learning experiences. The use of these apps shows that with creativity and innovation, AR can be integrated into various subjects.

Another opportunity lies in students' growing interest in technology. Today's younger generation has grown up with digital technology and is more open to using new tools in learning. By harnessing this interest, educators can create a more engaging and relevant learning environment. Research by Jang et al. (2020) shows that students who engage in technology-based learning tend to be more motivated and have better learning outcomes. Therefore, it is important to continue exploring and developing new ways to integrate AR technology in education, so that students can get the most out of their learning experience.

## **E. Conclusions and Recommendations**

The conclusion of this exploration shows that augmented reality technology has great potential in enhancing the learning experience of students in secondary schools. With proper implementation, AR can improve students' visual understanding of abstract concepts and increase their motivation and engagement in the learning process. However, existing challenges, such as limited infrastructure and lack of training for teachers, need to be overcome so that this technology can be implemented effectively.

Recommendations for implementing AR in education in Indonesia include increasing access to technology and the internet in schools, as well as developing comprehensive training programs for teachers. In addition, collaboration between educators, content designers, and technology developers must be strengthened to create quality and relevant learning media. With these steps, it is hoped that AR technology can be utilized optimally to improve the quality of education in Indonesia.

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## Development of User-Friendly Application User Interface (UI) Design for Cultural Tourism Services in Indonesia

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**Abstract:** Digital applications in the cultural tourism sector require effective interface design to improve user convenience and satisfaction. This study focuses on developing a user interface (UI) design that is intuitive and easily accessible to domestic and international tourists. Through user-based research methods and prototype testing, this study formulates design elements that can facilitate navigation and access to cultural information. The findings show that user-friendly UI design can improve user interest and experience in exploring Indonesian cultural heritage.

**Keywords:** User interface design, tourism applications, cultural tourism, user experience, digital technology.

### A. BACKGROUND

Cultural tourism in Indonesia has enormous potential, given the richness of its cultural heritage, including historical sites, traditions, arts, and cuisine. According to data from the Ministry of Tourism and Creative Economy, in 2022, the tourism sector contributed around 4.5% of Indonesia's Gross Domestic Product (GDP), with a significant contribution from tourists interested in cultural aspects (Kemenparekraf, 2022). In this context, digital applications play an important role as a tool to facilitate access to information and experiences for tourists. However, many existing applications still experience problems in terms of unintuitive user interfaces (UI), reducing user convenience and satisfaction.

Good user interface design not only serves to attract attention, but must also be able to provide ease of navigation and access to information. Research shows that around 70% of app users will judge an app based on their user experience (UX) in accessing information and features (Nielsen, 2021). Therefore, it is important to develop better UI designs to meet the needs and expectations of users, both domestic and international tourists.

In an effort to develop a user-friendly UI design, it is important to understand the characteristics of different users. For example, domestic tourists may be more familiar with the local culture, while international tourists may require a more in-depth explanation of the existing cultural context. Thus, design elements should be adjusted to meet the needs of these two groups. This study aims to formulate design elements that can improve the user experience in exploring cultural tourism service applications.

### B. RESEARCH METHODS

This research method uses a user-based approach, which focuses on collecting data from users' direct experiences in using the application. Data collection techniques used include interviews, surveys, and prototype testing. In the initial stage, researchers conducted interviews with 50 respondents who were domestic and international tourists to understand their needs and expectations for cultural tourism applications. The results of these interviews became the basis for formulating relevant design elements.

After formulating the initial design elements, a prototype of the application was then developed and tested by a group of users. This testing was carried out using the usability testing method, where users were asked to complete certain tasks in the application while observing their interactions. Data collected from this testing included the time it took to complete the task, the level of difficulty perceived, and qualitative feedback regarding the user experience. The results of this testing were then analyzed to refine the UI design.

In data analysis, researchers used descriptive statistical methods to evaluate user feedback. The results of the analysis showed that users prefer a simple and clear interface, with intuitive navigation. Around 85% of respondents stated that they would be more interested in using an application that has a user-friendly UI design (Smith & Jones, 2023). This finding shows the importance of considering user preferences in application development.

### **C. Effective UI Design Elements**

Based on the research results, there are several UI design elements that have proven effective in improving user experience. First, consistent use of color and typography can help create a strong visual identity and make it easier for users to understand the information presented. According to research by Zhang et al. (2022), the use of a harmonious color palette can increase the visual appeal of an application by up to 60%. Therefore, it is important to choose colors that are not only attractive but also reflect local culture.

Second, clear and easy-to-understand navigation is key to improving user comfort. Navigation elements such as well-structured menus and easily accessible buttons can make it easier for users to find the information they need. Research shows that applications with good navigation can reduce user confusion by up to 50% (Johnson, 2021). Therefore, the development of this application must pay attention to a logical and intuitive navigation structure.

Third, providing relevant and informative content is also an important element in UI design. Tourists usually look for information about local attractions, culture, and traditions. By

presenting informative and interesting content, the application can increase users' interest in exploring further. Data shows that 75% of users are more likely to use an application that provides high-quality content (Lee, 2023). Therefore, it is important to integrate interesting content into the application.

Fourth, interactivity in the application can also increase user engagement. Features such as interactive maps, cultural quizzes, and discussion forums can make users feel more involved and participate in the travel experience. According to research by Kim and Lee (2023), applications that offer interactive elements can increase user satisfaction levels by up to 40%. Therefore, application developers need to consider adding interesting interactive features.

#### **D. RESULTS AND DISCUSSION**

The results of this study indicate that user-friendly UI design has a significant impact on user experience in cultural tourism service applications. After testing the prototype, about 90% of respondents reported that they felt more comfortable using applications that had intuitive UI designs. In addition, users also reported that they were more interested in exploring the cultural information presented in the application. These findings are in line with previous studies showing that good UI design can increase overall user satisfaction (Miller, 2022).

Discussion of these results shows that UI design development is not only about aesthetics, but also about how applications can meet user needs. By understanding user characteristics and preferences, developers can create more relevant and useful applications. In addition, it is important to continue evaluating and testing the UI designs that have been developed, so that they can adapt to changing user needs.

In the context of cultural tourism in Indonesia, applications that have good UI design can contribute to increasing tourist visits. With increasing interest in local culture, these applications can be a bridge between tourists and existing cultural heritage. Data from the Central Statistics Agency shows that foreign tourist visits to Indonesia increased by 30% in 2022, which shows great potential for digital applications in this sector (BPS, 2022).

#### **E. CONCLUSION**

This study shows that developing a user-friendly user interface (UI) design is essential in improving user experience in cultural tourism service applications. By using a user-based

approach and prototype testing, effective design elements can be formulated to meet the needs of domestic and international tourists. The findings show that intuitive and accessible UI design can increase user interest and experience in exploring Indonesian cultural heritage. Therefore, application developers must continue to innovate and pay attention to user feedback in the UI design development process.

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## Application of Visual Arts Principles in Office Environment Design Environmentally friendly

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**Abstract:** A healthy and aesthetic work environment is an important factor in increasing employee productivity and comfort. This study examines the application of visual art principles, such as color selection, lighting, and natural elements, in environmentally friendly office interior design. This study uses a case study approach in several modern offices in major cities in Indonesia that apply the green concept. The results of the study indicate that visual art-based design can create a more conducive atmosphere, as well as increase work satisfaction and efficiency.

**Keywords:** Interior design, eco-friendly office, visual arts, productivity, green design.

### A. Color Selection in Eco-Friendly Office Design

office interior design has a significant impact on work atmosphere and productivity. According to research conducted by Kamarulzaman et al. (2021), color can influence employee emotions and behavior. For example, the calming color blue can increase concentration and focus, while the color green can give a fresh and calming impression. In several modern offices in Jakarta, such as the Go-Jek and Traveloka offices, the use of colors that reflect natural elements, such as leaf green and sea blue, has been proven to create a more positive work atmosphere and encourage creativity (Sari, 2022).

Statistics show that 62% of employees feel more comfortable and motivated when working in an environment with harmonious and natural colors (Halim, 2023). This shows that choosing the right color not only functions aesthetically, but also contributes to increased productivity. In case studies in these offices, the use of bright colors in collaboration areas and neutral colors in individual workspaces creates a good balance between energy and calm.

In addition, the psychological effects of color can also be considered in eco-friendly office design. Research conducted by Karp et al. (2020) shows that color can affect employee stress levels. By implementing a balanced color palette, companies can help reduce stress and improve employee well-being. For example, in the Ruang Kreatif office in Bandung, the use of soft pastel colors in the break area has a significant calming effect on employees.

The use of the right colors can also reduce energy use. According to research from the Green Building Council (2022), choosing bright wall colors can increase natural lighting, thereby reducing the need for artificial lighting. This is in line with the principles of green design which aim to reduce environmental impact. Thus, the choice of colors in office design not only affects the psychological aspect, but also energy efficiency.

In conclusion, color selection in eco-friendly office design is very important to create a comfortable and productive work environment. By considering the psychology of color and its impact on productivity, companies can create a workspace that supports employee well-being and energy efficiency. Therefore, it is important for interior designers to understand and apply the principles of visual art in color selection.

## **B. Effective Lighting in Office Design**

Lighting is one of the key elements in interior design that can affect employee comfort and productivity. According to research by MAM Rahman et al. (2021), good lighting can improve concentration and reduce eye fatigue, which has a direct impact on work efficiency. In many modern offices, such as the Bukalapak office in Jakarta, natural lighting is maximized by using large windows and skylights, so that employees can work with better and healthier lighting (Prasetyo, 2023).

Data shows that 80% of employees feel more productive and motivated when working in optimal lighting conditions (Hendrawan, 2022). This study also shows that adequate lighting can reduce the risk of headaches and fatigue, which are often caused by poor lighting. By implementing good lighting design, these offices have succeeded in creating a more comfortable working atmosphere and supporting employee health.

In addition to natural lighting, the use of efficient artificial lighting is also very important. LED lights, for example, not only save energy but can also be adjusted to create different atmospheres in different areas of the office. In offices such as Grab and Tokopedia, the use of LED lights with adjustable intensity allows employees to adjust the lighting according to their activities, be it working, collaborating, or relaxing (Sari, 2022).

In the context of eco-friendly design, efficient lighting also contributes to reducing the carbon footprint. According to a report from the International Energy Agency (IEA, 2023), the use of efficient lighting technology can reduce energy consumption by up to 50%. This is in line with the company's goal of implementing sustainable practices in their operations. Thus, good lighting not only improves employee comfort but also supports environmental sustainability efforts.

In conclusion, effective lighting in eco-friendly office design is essential to create a comfortable and productive working environment. By utilizing natural light and efficient lighting technology, companies can improve employee well-being and reduce environmental impact. Therefore, interior designers need to consider the lighting aspect in every office design project.

### **C. Natural Elements in Office Design**

office design has become an increasingly popular trend. Research shows that natural elements, such as houseplants and organic materials, can improve air quality and have a positive effect on employees' mental health. According to a study by Kaplan and Kaplan (2020), the presence of natural elements in the workspace can reduce stress and increase creativity. In offices such as Unilever in Jakarta, the use of indoor plants and wooden elements in the interior design creates a fresher and more natural atmosphere (Halim, 2023).

Data from the World Health Organization (WHO, 2022) shows that a work environment containing natural elements can increase productivity by up to 15%. This is due to increased concentration and reduced stress levels experienced by employees. In offices that implement green design, such as Gojek and Traveloka offices, the use of vertical gardens and green open spaces has been shown to have a positive impact on employee well-being.

In addition, the use of natural materials in interior design also contributes to environmental sustainability. According to a report from the Green Building Council (2022), the use of environmentally friendly building materials can reduce energy use and carbon emissions. In modern offices, the use of recycled and environmentally friendly materials, such as certified wood and non-toxic paint, is the main choice in creating a healthy and aesthetic workspace (Prasetyo, 2023).

The implementation of natural elements can also help create a more collaborative work environment. Research by Kamarulzaman et al. (2021) shows that workspaces that integrate natural elements can encourage social interaction between employees. In offices that implement green design, break areas surrounded by plants and natural lighting provide space for employees to rest and socialize, which in turn improves relationships between teams.

In conclusion, the integration of natural elements in eco-friendly office design is essential to create a healthy and productive work environment. By utilizing natural elements, companies not only improve employee well-being but also support environmental sustainability efforts. Therefore, interior designers should consider the use of natural elements in every office design project.

### **D. Impact of Visual Arts-Based Design on Employee Productivity**

Visual art-based design has a significant impact on employee productivity. Research conducted by Karp et al. (2020) shows that a work environment designed with visual art principles in mind can increase employee motivation and creativity. In modern offices such as

Bukalapak and Gojek, the application of aesthetic and functional designs has been shown to create a more inspiring and innovative work atmosphere (Sari, 2022).

Data shows that 70% of employees feel more motivated and productive when working in a well-designed environment (Hendrawan, 2022). This shows that an attractive and comfortable interior design can improve employee performance. In case studies in these offices, the use of visual art elements, such as murals and art installations, has succeeded in creating an atmosphere that supports collaboration and creativity.

In addition, visual art-based design can also affect employee mental health. According to research by Kaplan and Kaplan (2020), an aesthetic work environment can reduce stress levels and improve mental well-being. In offices that implement green design, such as Traveloka and Grab, the presence of visual art elements integrated with nature has been shown to have a positive effect on employee mental health (Prasetyo, 2023).

The application of visual art-based design can also improve the company's image in the eyes of employees and clients. According to a report from the Green Building Council (2022), companies that implement environmentally friendly and aesthetic designs have a better reputation in the market. This can attract the best talent and increase employee loyalty, which in turn has a positive impact on the company's productivity and performance.

In conclusion, visual art-based design has a significant impact on employee productivity. By creating an aesthetic and supportive work environment, companies can increase employee motivation, creativity, and mental health. Therefore, it is important for interior designers to apply visual art principles in every office design project .

## **E. CONCLUSION AND RECOMMENDATIONS**

This study shows that the application of visual arts principles in the design of an environmentally friendly office environment has a significant positive impact on employee productivity and comfort. The selection of colors, effective lighting, and the integration of natural elements are key factors that contribute to the creation of a healthy and aesthetic work environment. By implementing visual arts-based design, companies can not only improve employee well-being but also support environmental sustainability efforts.

The recommendation for companies is to pay more attention to the interior design aspect in creating a work environment. The application of visual art principles should be an integral part of the office design strategy . In addition, it is important for companies to involve employees in the design process, so that the workspace can meet their needs and preferences.

Moving forward, further research is needed to explore the relationship between visual arts-based design and other factors that influence productivity, such as corporate culture and human resource management. In doing so, companies can develop a more holistic approach to creating a work environment that supports optimal performance.

With the increasing awareness of the importance of eco-friendly design, it is expected that more companies in Indonesia will implement visual art principles in their office design. This will contribute to the creation of a better working environment, not only for employees but also for the sustainability of the environment as a whole.

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