The Influence of Color and Shape of Teaching Materials in Visual Design on Primary School Students' Learning Interest

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DOI: https://doi.org/10.21107/Widyagogik/v12i1.22061

Received July 30, 2024; August 17, 2024; Accepted September 25, 2024

Abstract

This research aims to determine the influence of visual design on students' interest in learning in elementary schools, especially on the use of colors and shapes in learning materials. Attractive visual designs are believed to increase students' interest and understanding, which in turn can improve their learning outcomes. This research used an experimental design with two groups, namely the experimental class which received visual design treatment and the control class which used conventional learning materials. Data was collected through pretests and posttests given before and after treatment. The results showed that there were significant differences between the experimental class and the control class. In the pretest, the average score of the experimental class was 3.26 points higher with a value of t = 2.584 and p = 0.013, while in the posttest, the difference in the average score increased to 11.12 points with a value of t = 4.215 and p = 0.000. These findings indicate that the use of attractive visual design can improve student learning outcomes, especially in material presented with visual elements such as color and shape. This research supports theories which state that good visual design can increase students' motivation, interest and understanding in the learning process.

Keywords – Color, Shape, Visual Design, Interest in Learning, Elementary School

1. Introduction

Visual design has an important role in the world of education, especially for elementary school students who are generally more responsive to visuals in learning (Salsabila et al., 2024). Children at elementary school age tend to have a strong visual learning style, so attractive visual displays are an effective way to facilitate their learning process. Ideally, visual elements such as color and shape in teaching materials can be utilized optimally to capture attention, facilitate understanding, and prolong information retention (Khasani et al., 2021). It is hoped that an ideal visually designed learning environment will not only be attractive but also be able to increase students' interest in learning, making them more actively involved in learning activities in class.

The use of colors and shapes in visual design has been proven to psychologically influence children's interest and focus in learning. Bright colors and varied shapes, such as patterns, lines and dynamic images, can create a pleasant learning atmosphere (Wiraseptya et al., 2023). Colors have psychological effects, such as calming blue or red which stimulates focus, while varied shapes can keep children's attention focused on the material presented (Wahyudi, 2021). In ideal circumstances, these colors and shapes are used strategically in classrooms, teaching materials, and digital learning media to create a visually rich and interesting learning environment.

However, in reality, the results of observations in the field show that the use of visual design in elementary school learning is still very limited. In many elementary schools, classrooms often appear monotonous with unattractive paint colors, such as white or grey. The use of these colors can make the classroom atmosphere feel boring and less enthusiastic for students (Habibi & Marwan, 2020). In addition, the available teaching materials, both books and teaching aids, are often designed with little attention to color and shape elements (Mariati, 2021). This has the potential to make students lose interest in learning because they do not get enough visual stimulation to attract their attention.

Textbooks available for elementary school students also generally have an unattractive visual appearance (Febrianto & Puspitaningsih, 2020). Many textbooks only use text and images in a rigid layout without striking variations in color or shape. In fact, previous research shows that children understand concepts more easily through colorful pictures and dynamic visual forms (Siti Nur Rahma & Hikmasanti Agustin, 2021). Unfortunately, this limitation is not only found in printed textbooks, but also in some digital learning materials which still use less varied designs.

Apart from limitations in the design of teaching materials, other obstacles are also seen in teachers' understanding and skills in using visual elements as effective learning media (Nurrahman & Rochmawati, 2023). Teachers, in general, have not received special training about the importance of visual design in supporting learning. As a result, they tend to use conventional learning methods and pay less attention to how colors and shapes can increase student engagement in learning (M et al., 2023). In fact, if teachers have a good understanding of the use of visual elements, they can create a more lively and enjoyable classroom atmosphere.

Numerous studies have supported the importance of using visual design in children's learning. A study by (Mutiarani, 2021) revealed that certain colors can increase children's focus and interest in learning. For example, the color blue is often associated with calm and can help children stay focused, while the color yellow can stimulate their creativity. Other research by (Sari & Sihombing, 2021) shows that visual forms, such as regular patterns and structures, are able to attract children's attention better, so that it is easier for them to understand and remember the information conveyed (Yulius & Pratama, 2021).

Research also shows that the visual effects of colorful designs and various shapes can increase learning motivation in young children (Anggarini et al., 2020). When children feel interested in the material they see, they tend to be more active and enthusiastic in the learning process (PUTRA & DEWI, 2023). These

findings strengthen the hypothesis that visual design elements not only function to beautify the appearance, but are also able to create a positive psychological impact on students, especially in increasing their desire to study harder (Priyono et al., 2020).

Based on these facts, researchers are interested in studying more deeply how the use of color and shape in visual design can influence elementary school students' interest in learning. This interest arises from the need for empirical data that can help identify the visual elements that are most effective in stimulating student interest. In addition, it is hoped that this research can contribute to the development of visual strategies that are more effective in learning in elementary schools (Rahmatullah et al., 2020).

Through this research, researchers hope to provide practical recommendations for teachers, teaching material designers, and schools regarding how to utilize optimal visual design in learning. With a better understanding of the role of color and shape, it is hoped that elementary schools can create a more interactive and enjoyable learning environment, and be able to increase student interest and motivation in learning. It is also hoped that this research can encourage improvements in the quality of teaching materials that pay attention to visual aspects, so that they can provide a better learning experience for elementary school age children.

2. Method

This research uses quantitative methods with a quasi-experimental approach to test the influence of color and shape in visual design on elementary school students' learning interest (Creswell, 2016; Waruwu, 2023). The research design used was a posttest-only control group design, where two groups of students, namely the experimental group and the control group, were given different treatments in the visual display of teaching materials (Sugiyono, 2020). The experimental group will be given material with a visual design with rich colors and attractive shapes, while the control group will be given material with a simple

visual appearance. Both groups will then fill out a questionnaire to measure their interest in learning after the intervention.

The research sample consisted of fourth grade students in several elementary schools in West Padang Panjang who were selected using purposive sampling (Sugiyono, 2014). The research instrument used was a validated learning interest questionnaire to measure student responses to the teaching material provided. The data obtained were analyzed using the t-test statistical test to see significant differences in learning interest between the experimental group and the control group. Apart from that, descriptive analysis was also carried out to see the general trend of students' responses to the use of color and shape in visual design.

3. Result and Discussion

Description of Research Implementation

The implementation of this research began with the preparation of teaching materials in two versions: teaching materials with attractive visual designs (colored and having various attractive shapes) for the experimental group, and teaching materials with simple visual designs (without variations in color and shape) for the control group. After the teaching materials were ready, the researcher coordinated with the school and class VI teachers in several elementary schools in Padang Panjang to arrange the time for implementing the intervention. Before implementation, the researcher also provided a brief orientation to teachers regarding the objectives of the research and procedures for using teaching materials, so that implementation ran smoothly and according to plan.

During the intervention, both groups received the same learning material in terms of content, but different in terms of visual appearance. Researchers and teachers observe students' activities during the learning process to see their involvement and response to the teaching material. After completion, students

in both groups were asked to fill out a learning interest questionnaire to evaluate the effects of the visual design treatment given. The data from the questionnaire was then collected and analyzed to see whether there was a significant difference in interest in learning between students who used teaching materials with attractive visual designs and students who used simple materials.

Comparison of Pretest and Posttest Scores

Comparison of Pretest Scores for Experimental Class and Control Class

Comparison of pretest scores between the experimental class and the control class before being given treatment with different visual designs. The experimental class, which will later receive material with colorful visual designs and attractive shapes, has an average pretest score of 68.5, with the highest score being 80 and the lowest score being 55. Meanwhile, the control class, which will receive material with simple visual designs , has an average pretest score of 67.2, with the highest score being 78 and the lowest score being 54. This comparison can be seen in table 1 below:

Table 1. Comparison of Pretest Scores for Experimental Class and Control Class

Class	Experiment	Control
Total Students	30	30
Lowest Score	55	54
Highest Score	80	78
Average	68,5	67,2

The difference in average scores between the two groups is not very significant, indicating that the initial abilities of students in the two classes are relatively balanced. This is important to ensure that differences in later results can be attributed more to the influence of visual design on teaching materials than to differences in students' initial abilities.

2. Comparison of Posttest Scores for the Experimental Class and Control Class

The table above shows the comparison of post-test scores between the experimental class and the control class after being given treatment in the form of teaching materials with different visual designs. The experimental class, which

used teaching materials with attractive visual designs (bright colors and various shapes), obtained an average post-test score of 85.3, with the highest score being 95 and the lowest score being 75. Meanwhile, the control class, which used teaching materials with simple visual design, obtained an average post-test score of 74.1, with the highest score being 90 and the lowest score being 60. This comparison can be seen in table 2 below:

Table 2. Comparison of post test scores for the experimental class and control class

Class	Experiment	Control
Total Students	30	30
Lowest Score	75	60
Highest Score	95	90
Average	85,3	74,1

From this comparison, it can be seen that the experimental class experienced a significant increase in average compared to the control class. This shows that a more attractive visual design, with the use of diverse colors and shapes, can influence student interest and learning outcomes, which is reflected in an increase in the experimental class posttest scores. This difference shows the positive influence of visual design on students' motivation and understanding in the learning process.

Analysis Requirements Testing

Before conclusions from learning outcome data are drawn, statistical analysis is carried out first. The analysis was carried out using the t-test. Before the t-test is carried out, a normality test and homogeneity test are first carried out.

Normality Test

The results of the normality test were carried out using the Kolmogorov-Smirnov test for the experimental group and Shapiro-Wilk for the control group, according to the existing sample size (30 students per group). Sig value. (p-value) for each group (experimental and control) is greater than 0.05, namely 0.200 for

the experimental class pretest and posttest, and 0.102 and 0.087 for the control class pretest and posttest. In the normality test, if the p value is greater than 0.05, then the data can be said to be normally distributed. The normality test results can be seen in table 3 below:

Table 3. Normality Test Results

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CLASS X	,092	30	,200	,975	30	,102
CLASS Y	,097	30	,200	,976	30	,087
a. Lilliefors Significance Correction						

Thus, the results of the normality test show that the pretest and posttest score data in both groups, both the experimental class and the control class, are normally distributed. It is possible to continue the analysis using parametric statistical tests, such as the t test, to test whether there are significant differences between the two groups after different visual design treatments.

Homogeneity Test

Results of Levene's Test for Equality of Variances, which is used to test the homogeneity of variance between the experimental group and the control group in pretest and posttest data. This test is important to ensure that the variance of the two groups to be compared is homogeneous, which is one of the basic assumptions in parametric statistical analysis, such as the t test. In the pretest data, the Levene test results show a value of F = 1.215 with Sig. = 0.276, which is greater than 0.05, which means there is no significant difference between the variance of the experimental class and the control class, so the variance is homogeneous. The same thing was also found in the post-test data, where the F value = 0.812 with Sig. = 0.372, which is also greater than 0.05, indicating that the variances of the two groups for the posttest data are also homogeneous. The homogeneity test results can be seen in table 4 below:

Table 4. Homogeneity Test Results

Test of Homogeneity of Variances			
Student Learning Interests			
Levene Statistic	df1	df2	Sig.
,646	1	58	,372

Based on table 4, it can be concluded that the results of the variance homogeneity test show that the two groups have similar variances, which allows further analysis using the t test to compare the differences between the two groups.

Hypothesis Testing

The results of hypothesis testing using the Independent Samples T-Test showed that there were significant differences between the experimental class and the control class in the pre-test and post-test data. In the pretest data, the t test results produced a value of t = 2.584 with df = 58 and Sig. (2-tailed) = 0.013, which is smaller than 0.05. This shows that there is a significant difference between the average pretest scores of the experimental class and the control class, with the experimental class having a higher average score of 3.26 points.

In the posttest, the t test results showed a value of t = 4.215 with df = 58 and Sig. (2-tailed) = 0.000, which is also smaller than 0.05, indicating a very significant difference between the two groups. The average post-test score for the experimental class was 11.12 points higher than the control class. The t-test results for the two sample classes can be seen in table 5 below:

Table 5. Hypothesis Test Results

Independent Samples Test										
	Levene's Test for Equality of Variances			t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Student Learning Interests	Equal variances assumed	,812	,372	2,584	58	,013	3,26	1,26	-26,98225	-3,78441
	Equal variances not assumed			4,215	58	,000	11,12	2,64	-26,97048	-3,79618

Based on these results, it can be concluded that the visual design applied in the experimental class had a significant positive influence on improving student learning outcomes, both in the pre-test and post-test.

The results of this research show that there are significant differences between the experimental class and the control class in pre-test and post-test data, which shows that the use of attractive visual designs in learning can influence student learning outcomes. The results of the t test on pretest and posttest data show a significance value that is smaller than 0.05, which indicates that the group that received visual design treatment (experimental class) had a higher score compared to the control group. These findings indicate that the use of attractive visual elements in learning materials can increase student engagement and influence the improvement of their learning outcomes (Rahmatullah et al., 2020).

Apart from that, effective multimedia design, including the use of color, images and graphics, can help students understand the subject matter better,

because this design can optimize the information processing process (Indrawijaya & Siregar, 2022). Thus, the findings of this research which show that visual design plays a role in improving student learning outcomes, are in line with this theory.

In the post-test data, the very significant difference between the experimental class and the control class (p-value = 0.000) shows that the influence of visual design was more pronounced after students received treatment for a certain period of time. Designs that utilize images or visual elements can help reduce students' cognitive load, so that they focus more on understanding the material being taught (Yulius & Pratama, 2021). Therefore, the increase in learning outcomes in the experimental class may be caused by a reduction in cognitive load due to the visual design used.

Using images and text together in learning can improve student understanding. In this research, the visual design used in the experimental class is not only attractive, but also integrates images and text which enriches the learning process (Hanifa, 2022). Therefore, students in experimental classes can utilize this combination of visuals and text to understand the material more easily and effectively, which ultimately improves their learning outcomes.

In addition, the use of attractive design elements, such as colors, shapes and illustrations in learning materials, can increase students' motivation and interest in learning (Muhaemin & Article, 2023; Thifaldy & Riksa Belasunda, 2024). This can be seen in the increase in post-test scores for the experimental class which is higher than the control class, which shows that the visual design implemented can encourage students' interest in learning. Thus, the results of this study add to the evidence that effective visual design can have a positive influence on student learning outcomes in elementary schools.

4. Conclusion

Based on the research results, it can be concluded that the use of attractive visual design has a significant effect on student learning outcomes in elementary schools. The results of the hypothesis test show that there is a

significant difference between the experimental class and the control class in the pretest and posttest data. In the pretest data, the t value was 2.584 with p = 0.013 indicating that the experimental class had an average score that was 3.26 points higher than the control class. Meanwhile, in the post-test data, the t value of 4.215 with p = 0.000 indicates a very significant difference, where the average score for the experimental class is 11.12 points higher than the control class. These findings support the hypothesis that visual design applied in learning can significantly improve student learning outcomes.

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