Visualizing Words: The Effectiveness of Colored Pictures in Teaching Vocabulary

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Abstract

This study uniquely explores the combined impact of colored pictures and student motivation on vocabulary mastery, an intersection rarely examined. This research investigates the effectiveness of colored pictures as a teaching medium and the role of student motivation in improving vocabulary comprehension among eighth-grade students at SMPN 19 Palu. A quasi-experimental design was employed, including 55 pupils split into two groups: a control group (n = 27) and an experimental group (n = 28). The experimental group was taught using colored pictures, whereas the control group followed conventional methods of instruction. Vocabulary mastery was assessed through Tests before and after, and students' motivation was measured using a Likert-scale questionnaire. The findings revealed that the experimental group outperformed the control group by a substantial margin, achieving an average post-test score of 72.92, compared to 61.46 in the control group. There was a statistically significant change ($p < 0.05$), demonstrating the effectiveness of colored pictures in enhancing vocabulary mastery. Moreover, students with higher motivation in the experimental group were successful. Superior scores, with an average of 75.30, compared to 69.10 for those with moderate motivation. These results confirm that colored pictures not only enhance vocabulary acquisition but also boost student engagement and motivation. The study suggests that integrating colored pictures into teaching strategies is a valuable approach to improving vocabulary mastery and fostering a more engaging setting for learning. For educators and legislators looking to improve vocabulary mastery results in language instruction, these studies provide valuable insights.4

Keywords: *Effectiveness, Colored pictures,Teaching Vocabulary, Vocabulary mastery, Student motivation.*

INTRODUCTION

A key component of learning a language is mastering vocabulary, which forms the basis for improving speaking, listening, reading, and writing abilities. In order to complement the four language skills, vocabulary is crucial since the more words one knows, the more easily one can communicate. Vocabulary mastery is a fundamental aspect of language learning, serving as the foundation for developing listening, speaking, reading and writing skills. Vocabulary is essential in supporting all four language skills; the more vocabulary a person has, the easier it is for them to communicate effectively. According to (Miolo, 2023; Nation, 2018; Xu, 2024), vocabulary is the core of learning content. Recent research further emphasizes the importance of vocabulary in language proficiency. Deliberate vocabulary instruction can significantly improve students' reading comprehension, writing skills and a growing vocabulary can improve students' overall communicative competence. (Xie, 2021; Zhang, 2022)

However, students often face significant challenges in mastering vocabulary due to limited methods, media and engaging teaching materials. At SMPN 19 Palu, grade VIII students showed difficulties in acquiring and remembering English vocabulary. This problem was exacerbated by low motivation and the absence of innovative learning media. These challenges highlight the need

for effective strategies to improve vocabulary learning and address the motivation gap in English education. A workable solution is to use visual aids.

Visual aids, especially colored pictures, have been recognized as powerful tools for vocabulary instruction. Previous research, such as (Cao, 2024; Dang, 2023; Mayer, 2014; Sumartini, 2023), emphasizes the role of visuals in facilitating dual coding, where learners process information both verbally and visually, thus improving retention and comprehension. (Carolina, 2019; Koshkina, 2022; Muhsinin, 2024; Situmeang, 2023) Further, it suggests that visual materials can positively impact vocabulary mastery by creating memorable associations between words and pictures. Despite these findings, there is still a lack of research focusing on the specific effects of colored pictures as a learning medium, especially in the context of Indonesian secondary schools. This study sought to fill this research gap by exploring the use of colored pictures to improve vocabulary mastery and motivation among eighth-grade students.

The study's three main goals are to: (1) assess how well-colored pictures help students master vocabulary; (2) determine whether the learning outcomes of students in the experimental and control groups differ significantly; and (3) investigate how colored pictures can boost students' motivation to learn vocabulary. By fulfilling these goals, the study hopes to offer valuable insights into cutting-edge instructional materials that improve vocabulary acquisition's effectiveness and appeal. Furthermore, the research aims to advance knowledge of how visual media might increase students' motivation and enhance language learning results.

This study's importance stems from its attempt to integrate theory and practice in language education. It is based on dual coding theory and existing literature, such as the work of Kumar (2020) and Muliati (2020), which underline the importance of motivation and innovative media in education. However, unlike previous studies that have focused mainly on abstract or black-and-white visuals, this study uniquely examines the impact of colored pictures, providing a novel approach to addressing the challenges of vocabulary learning.

In summary, this study answers a critical question: How effective are colored pictures in improving vocabulary mastery among eighth-grade students? Whether the learning results of the pupils in the experimental and control groups differ significantly. Can colored pictures increase students' motivation to learn vocabulary? By answering these questions, this study aims to offer theoretical contributions and practical recommendations for educators and policymakers who seek to improve vocabulary teaching through innovative teaching media. The hypotheses of the research are formulated as follows:

1. Null hypothesis (H0): There was not a significant difference between the result of the pre-test and post-test of the student's English vocabulary mastery by using colored pictures.
2. Alternative hypothesis (H1): There was a significant difference between the pre-test and post-test results of the student's English vocabulary mastery using colored pictures.

METHODS

This research employed a design that is somewhat experimental to examine the efficacy of coloured pictures in teaching vocabulary to eighth-grade students at SMPN 19 Palu and to assess the role of student motivation.

Research design

This study used a quantitative approach with a quasi-experimental design to examine the effectiveness of colored pictures in teaching vocabulary to eighth-grade students at SMPN 19 Palu and to assess the role of student motivation. Data were collected through pretest-posttest and questionnaire then the data were calculated using SPSS 25. The quasi-experimental research design is described as follows:

Table 1 Research Design

Groups	Pre-test	Independent Variabel	Post-test
Experiment	O1	X	O2
Control	O3	-	O4

Adapted from: (Sugiono, 2020)

Research participants and Sampling Procedures

The study's population consisted of all eighth-grade students at SMPN 19 Palu for the 2024–2025 academic year, totaling 93 students across four classes (VIII A, VIII B, VIII C, and VIII D). A purposive sampling method was used to select two classes, VIII C and VIII D, for the research sample, which included 55 students. This selection was based on recommendations from English teachers, who indicated that these classes faced difficulties in vocabulary mastery and exhibited low motivation. Class VIII C was designated as the experimental group (n = 13), while Class VIII D served as the control group (n = 17).

Table 2 Students Population

Name of Class	Number of Students
VIII A	33
VIII B	30
VIII C	17
VIII D	13
Total	93

Source: Smp Negeri 19 Palu

Data Collection

The researcher used pretest, posttest, treatment, and questionnaire to collect data related to students' vocabulary and motivation in English. In the pretest, the researcher gave a test that focused on students' vocabulary. The pretest was given to both experimental and control groups.

In the posttest, the researcher gave a test to the students after the treatment. The posttest was given to the experimental group and the control group to determine the achievement of students after being given treatment in the form of the use of color picture media by the teacher and also to determine the effectiveness of the use of the media.

The treatment was only given to the experimental group. The treatment was conducted for eight meetings which included pretest and posttest.

The questionnaire is a list of questions compiled based on indicators of the research variables given to the experimental class. This questionnaire contains 10 statements with answer options agree, neutral, and disagree.

Manipulations or Interventions

The intervention applied in this study was color pictures. The learning process was conducted through steps involving discussion and individual assignments. Research Conditions:

Experimental group: Students who will get the intervention, which is colored pictures to improve vocabulary mastery.

Control group: The control group is the students who will receive the traditional learning method without the colored pictures media, although this is not mentioned in this description.

RESULTS

A. Students Learning Outcomes

In this section, the researcher discussed in detail about students' learning outcomes in vocabulary learning which is the focus of this study. The analysis included a comparison between the pretest results provided prior to the unique treatment and the posttest findings following it. This discussion aims to see the extent to which the treatment given has a beneficial effect on student learning outcomes.

Table 3. Descriptive Statistics

	N Statistic	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Error	Std. Deviation Statistic
Pretest Control Group	17	27	90	53.29	4.464	18.404
Posttest Control Group	17	50	98	78.00	2.978	12.278
Pretest Experimental Group	13	13	63	40.77	4.555	16.422
Posttest Experimental Group	13	34	86	61.46	4.216	15.202
Valid N (listwise)	13					

The experimental group's pre-test had an average score of 40.77, with a standard deviation of 16.422, and scores ranging from 13 to 63. This suggests that the pre-test scores of the experimental group varied between 13 and 63, with a mean of about 40.77.

After the treatment, the lowest post-test score in the experimental group increased to 34, and the highest reached 86, with an average score of 61.46 and a standard deviation of 15.202. The improvement in the mean score from 40.77 in the pre-test to 61.46 in the post-test highlights the positive effect of the treatment on the experimental group. However, the increased standard deviation indicates greater variation in the scores within the group after the intervention.

In the control group, the pre-test results showed a narrower range, with scores between 27 and 90, an average of 53.29, and a standard deviation of 18.404. The post-test scores also improved, with a minimum of 50 and a maximum of 98, yielding a mean of 78.00 and a standard deviation of 12.278. This rise in the average score signifies overall improvement in the control group.

In summary, while the experimental group had a lower mean score in the pre-test compared to the control group, the post-test results for the experimental group showed a significant increase, indicating the positive effect of the treatment.

Table 4. Normality Test

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Group	Statistic	df	Sig.	Statistic	df	Sig.
Learning Outcomes	Pretest Control Group	.122	17	.200*	.947	17	.410
	Posttest Control Group	.165	17	.200*	.911	17	.105
	Pretest Experimental Group	.240	13	.039	.888	13	.091
	Posttest Experimental Group	.203	13	.146	.934	13	.387

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

The "Tests of Normality" table assesses the normality assumption of the learning outcomes data for both the experimental group (pre-test and post-test) and the control group (pre-test and post-test). The normality test was conducted using the Shapiro-Wilk method. According to the results of the Shapiro-Wilk Test, the significance value for the experimental group pre-test data is 0.091, indicating that the data follows a normal distribution. Similarly, the experimental group post-test, control group pre-test, and control group post-test all have significance values of 0.387, 0.410, and 0.105, respectively, suggesting that these data sets are also normally distributed.

Table 5. Homogeneity test

		Levene Statistic	df1	df2	Sig.
Students Learning Outcomes	Based on Mean	1.090	1	28	.305
	Based on Median	.627	1	28	.435
	Based on Median and with adjusted df	.627	1	26.988	.435
	Based on trimmed mean	1.163	1	28	.290

According to the test results, the Levene Statistic value is 1.090, with degrees of freedom (df1) of 1 and (df2) of 28. The obtained significance value (Sig.) is 0.305. Since this significance value is greater than the commonly used alpha level of 0.05, it indicates that there is no significant difference in variance between the data groups.

The results of the variance homogeneity test based on the median also showed a significance value greater than 0.05, specifically 0.435. Similarly, the homogeneity test based on the median with adjusted degrees of freedom yielded a significance value of 0.435, while the test based on the trimmed mean resulted in a significance value of 0.290.

B. Hypothesting Test:

1. The effective of using colored pictures in improving vocabulary mastery

Paired sample t-test is to test whether there is a difference in learning outcomes before pretest and posttest in the same group. The table below displays the treatment scores for the experimental group, which includes the scores after the application of colored pictures.

Table 6. Paired Sample t-test

		Paired Differences							
		Mean	Std deviation	Std error mean	95% confidence interval of the difference Lower	Upper	t	df	Sig (2-tailed)
Pair 1	Pretest experimental group – posttest experimental group	-20.692	14.221	3.944	-29.286	-12.099	-5.246	12	.000

The Paired Samples Test results showed a highly significant difference between the pre-test and post-test scores. The mean difference between the two tests was -20.692, with a standard deviation of 14.221 and a standard error of the mean of 3.944. The 95% confidence interval for this difference ranged from -29.286 to -12.099, which does not include zero. Additionally, the calculated t value was -5.246, with 12 degrees of freedom, and the significance value (2-tailed) was 0.000, much smaller than the 0.05 significance level.

These results strongly suggest that there is a significant difference between the pre-test and post-test scores, indicating that the treatment provided in this study effectively improved students' learning outcomes.

The paired sample t-test table also showed an average difference of -20.692, a standard deviation of 14.221, an average standard error of 3.944, a t value of -5.246, degrees of freedom (df) of 12, and a significance value (Sig. 2-tailed) of 0.000.

In hypothesis testing, the null hypothesis (H0) is accepted if the probability is greater than 0.05 and rejected if it is less than 0.05. In this case, the statistical analysis with an SPSS v.25 paired sample test yielded a p-value of 0.00, which is less than 0.05. Therefore, H1 is accepted and H0 is rejected. This confirms a statistically significant difference between the pre-test and post-test scores in the experimental group, demonstrating that the use of colored pictures had a positive and significant impact on improving the students' vocabulary learning outcomes in the eighth grade at SMPN 19 Palu.

2. The significant difference between students' learning achievements in the experimental group and the control group.

An independent samples t-test was performed to assess whether there was a significant difference in the average scores between two independent groups: the experimental group and the control group. The analysis compared the pre-test results and the post-test scores following the intervention, where the experimental group received instruction using colored picture media, while the control group was taught using conventional methods.

Table 7. Independent Sample t-test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Learning Outcomes	Equal variances assumed	1.090	.305	-3.299	28	.003	-16.538	5.014	-26.809	-6.268
	Equal variances not assumed			-3.204	22.718	.004	-16.538	5.162	-27.224	-5.853

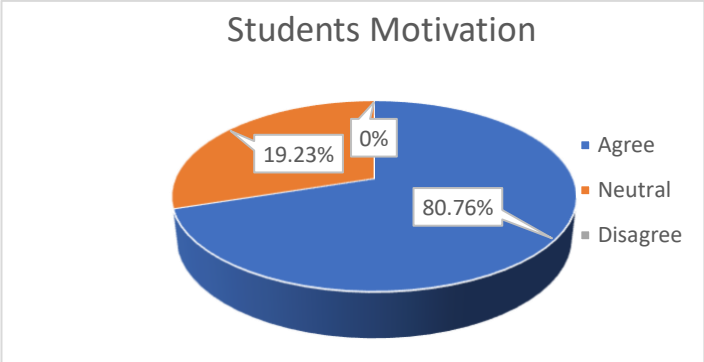
In the independent samples t-test, the degrees of freedom (df) were 28, with a significance value (Sig. 2-tailed) of 0.003. The 95% Confidence Interval (CI) ranged from -26.809 to -6.628, and the Levene Test produced an F value of 1.090. The t-value was 3.299, the mean difference was 16.538, and the standard error of the difference was 5.014. Since the significance value of the Levene Test (0.305) was greater than 0.05, the assumption of equal variances was met, allowing the analysis to proceed under the assumption of identical variances.

In hypothesis testing, the decision to accept or reject the null hypothesis (H0) is based on the significance value. If the Sig. (2-tailed) is less than 0.05, the null hypothesis (H0) is rejected, indicating a significant difference in the learning outcomes between the experimental and control groups. Conversely, if the Sig. (2-tailed) is greater than 0.05, the null hypothesis (H0) is accepted, implying no significant difference in the learning outcomes between the two groups.

3. The incorporation of colored pictures improved students' motivation in learning vocabulary.

In the context of applying color pictures in vocabulary learning, students' motivation is important to be studied. This is because the use of color pictures as one of the learning media can affect students' motivation, interest, and participation throughout the educational process. Consequently, an analysis of eighth-grade pupils' perceptions is required of SMPN 19 PALU regarding the application of colored pictures in vocabulary learning. A deep understanding of students' motivation can help teachers design and implement more effective learning that suits students' needs and preferences.

Figure 1. Students Motivation Result



The results of the questionnaire assessing students' motivation levels indicate that the majority of students exhibit high motivation. A total of 80.76% of students selected the "Agree" option, suggesting that most students are motivated to engage in the learning process. This high motivation may be attributed to several factors, such as the use of engaging learning materials, the relevance of the content to students' everyday lives, or interactive teaching methods.

In addition, 19.23% of students showed a neutral attitude towards learning by choosing the option “Neutral.” Students in this category do not show very high motivation, but neither do they feel unmotivated. This suggests the need to further identify factors that might affect their motivation, such as difficulty understanding the material, lack of interest in the topics taught, or external factors such as the learning environment.

Interestingly, no students chose the option “Disagree,” or felt not motivated at all. This suggests that there were no major barriers that significantly disrupted students' motivation in this lesson. This success can be attributed to the implementation of effective learning media, such as the use of colored pictures, which are thought to increase student interest and engagement. As a visual medium, colored pictures not only help students understand concepts, but also create a more enjoyable learning atmosphere. Thus, these results provide a strong basis to support the use of creative media such as pictures in improving students' overall learning motivation.

DISCUSSION

The discussion of this research is structured based on three main aspects: first, is the use of colored pictures effective in improving vocabulary mastery of class VIII students at SMPN 19 Palu; and second, is there a significant difference in student learning achievement between the experimental group and the control group; and third, can the use of colored pictures increase students' motivation in learning vocabulary in class VIII SMPN 19 Palu?

First, this research aims to determine whether there are significant differences in learning achievement between the experimental group, which uses colored picture media, and the control group, which does not. The experimental group employed innovative learning media, while the control group relied on conventional teaching methods.

The experimental group, which learnt using colorful picture media, and the control group, which employed conventional teaching techniques, differed significantly in their learning accomplishment, according to the study's findings. In comparison to the control group, the experimental group, which was taught utilizing cutting-edge visual aids, had a noticeably greater gain in learning outcomes. These results were validated by statistical analysis, which showed that the differences were statistically significant with a p-value below 0.05.

The findings of this investigation have shed light on how the use of colored pictures influences vocabulary mastery among eighth-grade students. Answering the research question posed in the

introduction, it was found that the use of colored pictures significantly improved students' vocabulary learning, as evidenced by increased test scores and high levels of motivation reported by students. This finding aligns with previous studies highlighting the importance of visual aids in transforming abstract vocabulary concepts into concrete and more easily memorable forms (Smith, 2020;)

Expert opinion supports these findings. Pictures are multimedia that can make students' experiences and understanding broader, clearer, more concrete in students' memories and interactions and not easily forgotten (Liando, 2022; Mayer, 2014). Overall, this research proves that the use of colored pictures as a learning tool is very effective in improving students' mastery of competencies. The increase in points between the test before and after shows that Students not only learned new vocabulary but were also able to remember and use it better after implementing colorful pictures in their learning activities.

The second goal of this study is to ascertain if there are any appreciable variations in learning outcomes between the experimental group—which uses colorful image media—and the control group, which does not. While the control group employed traditional learning techniques, the experimental group's strategy made use of cutting-edge learning materials.

The experimental group, which used color picture media, and the control group, which used traditional teaching methods, differed significantly in their learning accomplishment, according to the study's findings. After being taught using advanced media in the form of vibrant visuals, the experimental group showed a considerably larger gain in learning outcomes than the control group. These findings were supported by statistical analysis, which showed that the differences were statistically significant with a p-value of less than 0.05.

The use of colored pictures in the experimental group not only provided a visual context that helped vocabulary mastery but also increased student engagement and motivation during learning. This approach creates a more interactive and interesting learning experience, which is in line with the view of (Reeve, 2018). This suggests that a supportive learning environment and engaging media can greatly enhance student learning outcomes. Additionally, these findings also support previous research (Smith, 2020), which concluded that interactive and innovative learning methods produce better learning achievements than conventional methods.

The results obtained from the experimental group show that innovative learning media, such as colored pictures, can create a more meaningful learning experience, where students are inspired to actively engage in the learning process in addition to having a deeper understanding of the subject matter. In contrast, the control group using conventional methods tended to have lower levels of engagement and learning outcomes, indicating that traditional approaches were less effective in providing a positive impact on vocabulary learning.

The importance of these results lies in their consistency with cognitive learning theories, particularly dual coding theory, which states that linguistic and visual information are processed together, resulting in better retention (Paivio, 2014). In this study, colored pictures acted as effective visual stimuli, improving students' ability to connect words with their meaning. These findings are consistent with recent research (Lee, 2022), which shows that visually appealing materials significantly improve language learning outcomes. In addition, research (Munani, 2024) revealed that the use of colored pictures improved speaking abilities in children with speech delays, supporting the conclusion that visual aids improve various aspects of language learning. This study is novel because it addresses a gap in the literature about the use of colored pictures in Indonesian secondary schools by concentrating on their specific application in a quasi-experimental configuration.

To answer the third research question regarding whether colored pictures can increase students' vocabulary and learning motivation. The results of this research show that the application of colored picture media possesses a positive influence on students' learning motivation in vocabulary learning. This is in accordance with previous findings, which state that intrinsic motivation is a crucial component of encouraging students' academic success (Kumar, 2020; Levesque, 2010). The use of colored picture media makes a significant contribution to creating a

supportive learning atmosphere, specifically enabling students to participate in the learning process in an active and autonomous manner.

According to questionnaire data involving four motivation indicators, namely Self-Desire, Awareness, Satisfaction and Good Habits, it is known that the majority of students show a significant increase in motivation after learning using colored pictures. This finding corresponds with studies conducted by (Riswanto, 2017), which declare that strong motivation contributes to better learning outcomes. In this context, colored picture media not only increases learning motivation but also strengthens students' emotional and psychological involvement. This is in line with recent studies that underline the necessity of having a supportive learning environment to increase learning results.

The limitations of this study must also be acknowledged. First, the fact that there is just one school included in the sample may restrict how broadly the results may be used. Future studies have to think about increasing the sample size to include schools from different regions and socio-economic backgrounds. In addition, although this research focuses on nouns, verbs, adjectives, and adverbs, it does not explore the impact of colored images on other linguistic elements, such as idioms or phrases. This paves the way for further exploration of how visual aids can support various aspects of language learning. Recent research conducted by (Nirwanawati, 2022) highlights the effectiveness of picture and word cards for deaf students, thereby showing that a similar methodology can be applied to diverse groups of students.

Another limitation is the reliance on students' self-reported motivation levels, which, although valuable, may not fully reflect the complexity of their learning experiences. To further understand how students engage with visual aids in the learning process, future studies might include qualitative techniques like interviews or classroom observations. Furthermore, the absence of negative responses in the motivation questionnaire suggests that additional research is needed to confirm the robustness of these findings in various contexts. Research such as that conducted by (Hikmah, 2022) shows that incorporating visual media into language teaching can consistently provide positive results, although challenges in implementation still need to be overcome.

These findings suggest several areas for future research. One interesting direction would be to investigate the long-term retention of vocabulary learned through colored pictures compared to other media. Additionally, exploring the integration of digital tools that utilize colored pictures, such as interactive applications or augmented reality, can offer insightful information on the modernization of teaching strategies. For example, research conducted by (Hasmi, 2017) shows the potential of integrating multimedia tools with traditional classroom practices to increase vocabulary retention. Finally, further investigation into the interactions between colored pictures and other motivational factors, such as teacher feedback or peer collaboration, might improve knowledge of how to make the most of visual aids in the classroom.

Additionally, integration of contemporary technologies with colored picture opens the door to new teaching media. Digital tools, such as augmented reality and interactive multimedia, can make vocabulary learning more engaging and contextual. Research by (Matondang, 2021) highlights how technology-enhanced learning environments can meet a variety of learner preferences and improve academic performance. This is very relevant in today's technology-based educational environment, where students are used to multimedia interfaces.

CONCLUSION

This study has proved the considerable benefit of employing colorful pictures as an innovative teaching medium in boosting vocabulary learning among eighth-grade students at SMPN 19 Palu. The findings fill a research gap by focusing on the combined effects of colored visuals and student motivation on vocabulary mastery, an area previously less explored.

The results confirmed that students taught using colored pictures achieved higher vocabulary mastery compared to students taught with conventional methods. The experimental group

outperformed the control group, demonstrating a statistically significant improvement in post-test scores, rising from an average of 40.77 to 61.42. This demonstrates how well-colored pictures may produce an interesting and lasting learning experience.

Furthermore, the study highlighted the role of colored pictures in enhancing students' motivation. Questionnaire data showed high levels of motivation among the students, with positive responses across indicators such as self-desire, satisfaction, awarness and good study habits. These results emphasize that the integration of visual media into teaching strategies fosters a supportive and stimulating environment conducive to active participation and long-term learning success.

This study's novelty is the contextual use of colorful graphics in a secondary school context in Indonesia. The results provide useful information for educators and policymakers who wish to enhance vocabulary teaching strategies and further our understanding of the function of visual media in language acquisition. To further improve the efficacy of instruction, future studies should examine the impacts of long-term retention and the combination of digital tools and colorful graphics.

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