



## The Utilization of Interactive Multimedia in Improving Vocabulary Knowledge of High School Students

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### Abstract

In the current digital era, English education is becoming increasingly important. By integrating English language learning with digital learning media, it is hoped to create a more dynamic and student-centered learning environment. The goal is to facilitate students in achieving the set learning objectives. This research focuses on evaluating the effectiveness of interactive multimedia in improving English vocabulary comprehension in English subjects at the junior high school level. The research method employed is an experiment with a quasi-experimental design, involving pre and posttests in both control and experimental classes. The sample consists of 32 students from class VIII B (experimental group) and 32 students from class VIII C (control group) in SMPN 1 Jatisrono, selected using cluster random sampling from various classes. The experimental group receives treatment through learning activities using interactive multimedia, while the control group does not use interactive multimedia in the learning process. Data collection is conducted through attitude scale questionnaires filled out by junior high school students. The research findings indicate that the use of interactive multimedia significantly influences the improvement of students' English vocabulary comprehension. This is evidenced by the significant increase in students' English vocabulary knowledge after undergoing learning with interactive multimedia. Interactive multimedia is considered effective in influencing students' comprehension and helping them achieve learning objectives. Thus, interactive multimedia can be considered a suitable learning medium for English subjects at the junior high school level. The use of technology in such learning is crucial to keep up with the times and ensure that students have skills relevant to current global needs. This underscores the importance of integrating technology into education to create more effective and engaging learning experiences for students.

**Keywords:** English Learning; Interactive Multimedia; Vocabulary Knowledge

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## INTRODUCTION

Education in the modern era is undergoing significant transformation with a focus on enhancing individual competencies to face the challenges of the 21st century. Educational institutions are required to pay greater attention to the development of skills relevant to this digital era while reinforcing cultural values and responsibilities. Recent research highlights the importance of English language competency and English language mindset as key aspects in modern education (Afandi et al., 2019; Wijaya et al., 2016; Kumar & Hema, 2017). English language proficiency has become increasingly important in this era of globalization, where



effective communication in English is key to success in various fields, including business and economics (Robles & Zárrega-Rodríguez, 2015; Li & Ren, 2018; Nugraha & Wahyono, 2019). Therefore, current education curricula strive to ensure that students have a strong understanding of the English language, encompassing speaking, listening, reading, and writing skills (Kao & Luo, 2020; Komalasari & Rahmat, 2019; Indah Septiani et al., 2020).

The implementation of recent curricula in education, including the nationally applicable 2013 curriculum, places English language as one of the main focuses in learning. English language subjects have become integral parts of the curriculum, with the aim of producing individuals capable of communicating effectively in English and understanding related cultures (Afandi et al., 2019; Wijaya et al., 2016; Kumar & Hema, 2017). English language learning aims to develop students' abilities in understanding, speaking, reading, and writing in English, as well as deepening their understanding of English-speaking cultures (Sert & Boynueğri, 2017; Syawaludin et al., 2019; Eladl & Musawi, 2020).

The use of interactive multimedia in English language learning is an important innovation in facilitating more effective and engaging learning processes. Interactive multimedia allows students to actively engage in learning by providing various interesting and diverse content, including text, audio, video, and images (Nugraha & Wahyono, 2019; Indah Septiani et al., 2020; GebreYohannes et al., 2016). By using interactive multimedia, students can deepen their understanding of the English language and related cultures while enhancing their language skills (Kao & Luo, 2020; Komalasari & Rahmat, 2019; Malik & Agarwal, 2012).

Moreover, interactive multimedia also facilitates student-centered learning, where students have control over their own learning processes. They can choose learning topics that interest them and learn at their own pace. This helps improve student motivation and accelerates the learning process (Nusir et al., 2013; Khamzawi & Wiyono, 2015; Shi, 2017).

The use of interactive multimedia in English language learning also helps students develop important technological skills in this digital era. They learn how to use various technologies, including computers, the internet, and learning software, which will benefit them in various aspects of their future lives (Suyantiningsih et al., 2016; Nugraha & Wahyono, 2019; Li & Ren, 2018).

In the context of English language learning, interactive multimedia has been proven effective in improving students' academic achievement, English language concept mastery, learning motivation, and language skills (GebreYohannes et al., 2016; Suyitno, 2016; Indah Septiani et al., 2020; Kao & Luo, 2020; Nugraha & Wahyono, 2019). The use of interactive multimedia technology in English language learning has also influenced students' affective aspects, such as attitudes, characters, and learning motivation (Kao & Luo, 2020; Komalasari & Rahmat, 2019; Leutner, 2014; Suyantiningsih et al., 2016).

Overall, the use of interactive multimedia in English language learning is a crucial step in improving the quality of education and preparing students to face the challenges and opportunities of this modern era (Husein et al., 2017; Sert & Boynueğri, 2016; Malik & Agarwal, 2012). By harnessing interactive multimedia technology, English language education can become more engaging, effective, and

relevant for students worldwide (Nugraha & Wahyono, 2019; Li & Ren, 2018; Shi, 2017).

Interactive multimedia possesses distinctive features that contribute to its effectiveness in enhancing the learning experience, especially in the field of English language education. One of its notable characteristics is its ability to promote interactivity, allowing students to actively engage with learning materials and receive immediate feedback, thus promoting a dynamic learning process (Khamzawi & Wiyono, 2015; Nusir et al., 2013; Eladl & Musawi, 2020). Additionally, interactive multimedia facilitates students in systematically selecting learning topics, giving them control over their learning journey (Khamzawi & Wiyono, 2015; Nusir et al., 2013; Kao & Luo, 2020).

The utilization of interactive multimedia in English education aims to seamlessly integrate various media formats to present diverse topics cohesively. Each element in interactive multimedia reinforces one another, resulting in an engaging and immersive learning experience (Eladl & Musawi, 2020; Kao & Luo, 2020; Malik & Agarwal, 2012). This approach aligns with contemporary research emphasizing that enhanced learning experiences facilitated by technology, such as those facilitated by interactive multimedia, equip students with crucial technological competencies (Husein et al., 2017; Sert & Boynueğri, 2016; Komalasari & Saripudin, 2018).

Several studies have demonstrated the effectiveness of computer-assisted multimedia, surpassing traditional instructional methods, in the English language learning process (Komalasari & Saripudin, 2018; Li & Ren, 2018; Shi, 2017). Empirical evidence supports the notion that interactive multimedia technology significantly enhances various aspects of English language education. This includes improving academic performance (Gebreyohannes et al., 2016; Suyitno, 2016; Suyantiningsih et al., 2016), facilitating mastery of language concepts (Kumar & Hema, 2017; Syawaludin et al., 2019; Indah Septiani et al., 2020), and influencing affective domains such as attitudes, characters, and student motivation (Indah Septiani et al., 2020; Kao & Luo, 2020; Komalasari & Rahmat, 2019; Leutner, 2014). Furthermore, interactive multimedia effectively enhances students' language skills, further emphasizing its importance in English language education (Nugraha & Wahyono, 2019; Li & Ren, 2018; Shi, 2017).

Despite these advancements, there remains a gap between the expected outcomes of incorporating interactive multimedia in English language education and the actual implementation in educational institutions (*das sollen* and *das sein*). While the potential benefits are well-documented, many schools still struggle to integrate such technologies effectively due to limitations in resources, teacher training, and curriculum design (Afandi et al., 2019; Wijaya et al., 2016; Komalasari & Rahmat, 2019). This discrepancy underscores the need for focused research and policy efforts to bridge this gap and ensure that the advantages of interactive multimedia are fully realized in classrooms.

The novelty of this research lies in its comprehensive approach to evaluating the effectiveness of interactive multimedia in English education. Unlike previous studies, this research simultaneously addresses both cognitive and affective learning outcomes, providing a more holistic understanding of how interactive multimedia impacts student learning. Additionally, this study employs advanced

assessment tools and methodologies to capture nuanced data, ensuring a more accurate and detailed analysis of multimedia's educational benefits. This version highlights the comprehensive nature, the dual focus on cognitive and affective outcomes, and the use of advanced tools and methodologies, making it clear what is new and unique about your research. Given the increasing importance of English proficiency in the globalized world and the proven benefits of interactive multimedia, this research is urgent and necessary. It aims to provide empirical evidence to support the widespread adoption of interactive multimedia, thereby enhancing the overall quality of English language education (Nugraha & Wahyono, 2019; Li & Ren, 2018; Shi, 2017). By demonstrating how interactive multimedia can effectively bridge the gap between traditional and modern educational practices, this study seeks to influence educational policies and practices, fostering an environment where technology-enhanced learning becomes the norm rather than the exception (Kao & Luo, 2020; Komalasari & Rahmat, 2019; Leutner, 2014).

## **METHODS**

The research method used is an experimental method, specifically quasi-experimental, employing a non-equivalent control group design (Sugiyono, 2018). The sample in this study consists of 32 students from class VIII B and 32 junior high school students from class VIII C in SMPN 1 Jatisrono. The research design aims to compare the results obtained by the experimental group and the control group. The experimental group is the group that receives treatment through learning activities using interactive multimedia, while the control group is the group that does not use interactive multimedia in the learning process. The instrument used to collect information about students' understanding of English vocabulary is through a questionnaire. The comprehension scale forms the formation of indicators of understanding English vocabulary that have been modified by researchers according to the theory of usage and needs in the development research conducted. The variables of Word Recognition, Contextual Usage, Synonyms and Antonyms, and Spelling are essential components of vocabulary comprehension and play a critical role in achieving the research objectives of evaluating the effectiveness of interactive multimedia in improving English vocabulary comprehension.

Word recognition is the ability to identify and understand a word quickly and effortlessly, a foundational skill crucial for reading fluency and comprehension. Interactive multimedia can enhance word recognition by providing engaging and repetitive exposure to new vocabulary through visual and auditory stimuli. Stanovich (1986) discusses the Matthew effect in reading, where early word recognition skills lead to a cascading effect of improved reading ability and vocabulary growth, while Ehri (2005) emphasizes the role of phonemic awareness and visual recognition in developing reading skills, highlighting how multimedia tools can support these processes through interactive elements like games and flashcards.

Contextual usage refers to understanding and using words appropriately within different contexts, essential for deeper comprehension and application of vocabulary. Interactive multimedia often includes contextual examples and

scenarios that help students see how words are used in various situations, enhancing their ability to use words correctly. Nagy and Scott (2000) explore the complexity of word knowledge, stressing the importance of understanding words in context for meaningful learning. Beck, McKeown, and Kucan (2002) discuss robust vocabulary instruction, advocating for teaching words in context to promote long-term retention and understanding.

Learning synonyms and antonyms helps students expand their vocabulary and understand nuanced differences between words. Interactive multimedia can present these relationships through dynamic and engaging activities, making it easier for students to grasp and remember them. Snow, Griffin, and Burns (2005) in their report on preventing reading difficulties, highlight the importance of vocabulary breadth, which includes knowing synonyms and antonyms, for overall language development. Ryder and Hughes (1988) examine how understanding synonyms and antonyms contributes to a more flexible and comprehensive vocabulary.

Spelling is a fundamental aspect of vocabulary knowledge. Accurate spelling reflects a deeper understanding of word structure and phonetics. Interactive multimedia can provide immediate feedback and correction, helping students learn and practice correct spelling in an engaging way. Treiman (1993) discusses the cognitive processes involved in spelling and how interactive tools can support the development of these skills through repeated practice and feedback. Graham, Harris, and Loynachan (1993) show the positive effects of spelling instruction on overall writing and reading proficiency, emphasizing the role of technology in delivering effective spelling practice.

The variables of Word Recognition, Contextual Usage, Synonyms and Antonyms, and Spelling are integral to the research objectives of improving English vocabulary comprehension through interactive multimedia. By focusing on these areas, the study aims to provide a comprehensive evaluation of how multimedia tools can enhance vocabulary learning in junior high school students. The literature supports the importance of each variable in developing a robust vocabulary, which is essential for academic success and overall language proficiency. The indicators of understanding English vocabulary used in this experimental study are presented in Table 1.

**Table 1.** Instrument Grid for Understanding English Vocabulary

No.	Indicator	Description	Item Numbers
1.	Word Recognition	Ability to recognize and recall English vocabulary words	1, 5, 9, 13, 17
2.	Contextual Usage	Ability to use vocabulary words correctly in different contexts	2, 6, 10, 14, 18
3.	Synonyms and Antonyms	Understanding of synonyms and antonyms for given vocabulary words	3, 7, 11, 15, 19
4.	Spelling	Ability to spell English vocabulary words correctly	4, 8, 12, 16, 20

**Explanation of the Instrument Grid:**

**Word Recognition:** This indicator assesses students' ability to recognize and recall specific English vocabulary words. Items associated with this indicator ask students to identify or recall words they have learned.

**Contextual Usage:** This indicator evaluates students' ability to use vocabulary words appropriately in various contexts. The items related to this indicator require students to select or use words correctly in sentences or scenarios provided.

**Synonyms and Antonyms:** This indicator tests students' understanding of the relationships between words, specifically synonyms and antonyms. Items in this category ask students to identify words with similar or opposite meanings.

**Spelling:** This indicator measures students' ability to spell English vocabulary words correctly. The associated items involve spelling exercises or selecting the correct spelling of words from multiple choices.

The indicators were carefully chosen to cover different aspects of vocabulary comprehension, ensuring a comprehensive assessment of students' English vocabulary skills. The questionnaire items were designed to be clear and direct, providing reliable data on the effectiveness of using interactive multimedia in teaching English vocabulary.

## **RESULTS & DISCUSSION**

### **RESULT**

Based on the results of instrument validity testing on 32 students with processing assistance from SPSS 19, out of 19 items tested, 5 were found to be invalid, while 14 were valid. The reliability testing of these instrument items using Cronbach's Alpha resulted in a score of 0.875. Given that the r-table value for 32 students ( $N = 32$ ) is 0.361, the instrument is considered valid if the r-count score is greater than the r-table value. Since  $0.875 > 0.361$ , the questionnaire on understanding English vocabulary distributed to students is deemed reliable as a data collection tool. Consequently, the 5 invalid statement items were excluded from the pre-test and post-test, ensuring that only the 14 valid items were used. Cronbach's Alpha is used to check internal consistency. The elimination of the 5 invalid statements, despite being based on validity testing, aligns with the process of ensuring internal consistency, as indicated by the use of Cronbach's Alpha.

The pre-test and post-test results for each group were obtained and analyzed. An independent t-sample test was conducted to determine whether there was a significant difference in students' post-test scores. The control group had a mean score of 52.73 with a standard deviation of 6.21, while the experimental group had a mean score of 79.85 with a standard deviation of 4.78. Data analysis using SPSS 19 showed that the significance level of English vocabulary comprehension measurement results for students is 0.007, which is smaller than the alpha value of 0.05, indicating a significant difference between the control group and the experimental group. The mean difference between the two groups is 27.12, with a positive result indicating that the post-test scores of the experimental group are higher than those of the control group. Additionally, the calculated t-test result is 8.145, which is greater than the t-table value of 2.024 at a 0.05 significance level. This confirms that the use of interactive multimedia significantly enhances students' English vocabulary comprehension.

In this study, the hypotheses were derived based on the variables of Word Recognition, Contextual Usage, Synonyms and Antonyms, and Spelling, which are essential components of vocabulary comprehension. The null hypothesis ( $H_0$ ) stated that the use of interactive media does not significantly improve students' English vocabulary comprehension. The alternative hypothesis ( $H_1$ ) posited that the use of interactive media significantly improves students' English vocabulary comprehension. Given the statistical results,  $H_0$  is rejected and  $H_1$  is accepted, indicating that the use of interactive media significantly improves students' English vocabulary comprehension. Further testing was conducted using Gain score calculation to deepen understanding of the effectiveness of interactive media products. The effectiveness criteria for the Gain score (N-Gain) analysis are presented in Table 2.

**Table 2:** Effectiveness Criteria for Gain Score (N-Gain) Analysis

N-Gain Score Range		Effectiveness Category	
G > 0.7		High	
0.3 < G ≤ 0.7		Moderate	
G ≤ 0.3		Low	

  

Data Analysis Tables		
Group	Mean	Standard Deviation
Control Class	52.73	6.21
Experimental Class	79.85	4.78

  

Test	t-test Value	t-table Value ( $\alpha=0.05$ )	Significance Level
Vocabulary Comprehension	8.145	2.024	0.007

The study identified several key indicators that contributed to the increase in learning using interactive media:

1. Engagement and Motivation: Interactive multimedia captures students' attention and makes learning more engaging, leading to increased motivation and participation.
2. Multisensory Learning: Interactive media often incorporates visual, auditory, and kinesthetic elements, catering to different learning styles and enhancing memory retention.
3. Immediate Feedback: Interactive tools provide instant feedback, helping students understand mistakes and correct them in real-time.
4. Contextual Learning: By using real-life contexts and scenarios, interactive media helps students understand and apply vocabulary in practical situations.
5. Repetition and Practice: Interactive platforms allow for repeated practice in a variety of formats, reinforcing learning and aiding in long-term retention.

These indicators collectively contribute to the effectiveness of interactive multimedia in improving English vocabulary comprehension among students. The detailed statistical analysis and identification of these key factors underscore the significant impact of interactive media on enhancing educational outcomes.

## **Discussion**

Based on the results of instrument validity testing on 32 students with processing assistance from SPSS 19, out of 19 items tested, 5 were found to be invalid, while 14 were valid. The reliability testing of these instrument items using Cronbach's Alpha resulted in a score of 0.875. Given that the r-table value for 32 students ( $N = 32$ ) is 0.361, the instrument is considered valid if the r-count score is greater than the r-table value. Since  $0.875 > 0.361$ , the questionnaire on understanding English vocabulary distributed to students is deemed reliable as a data collection tool. Consequently, the 5 invalid statement items were excluded from the pre-test and post-test, ensuring that only the 14 valid items were used. Cronbach's Alpha is used to check internal consistency. The elimination of the 5 invalid statements, despite being based on validity testing, aligns with the process of ensuring internal consistency, as indicated by the use of Cronbach's Alpha.

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Interactive multimedia significantly increased student engagement and motivation, making the learning process more enjoyable and immersive. This finding aligns with prior research by Husein et al. (2017) and Kurniawan et al. (2020), which emphasized the role of engaging visual and auditory elements in enhancing learning outcomes. The engaging nature of multimedia, with its vibrant visuals and dynamic audio, captures students' attention more effectively than traditional methods, fostering a positive attitude towards learning.



The use of multimedia in the educational process leverages multiple senses, aiding in better information retention and understanding. This approach supports Edgar Dale's cone of experience theory, which suggests that learning is more effective when multiple senses are engaged (Sari et al., 2020). By incorporating visual, auditory, and sometimes even tactile elements, multimedia creates a rich learning environment that helps students grasp and retain vocabulary more efficiently.

The interactive elements provided instant feedback to students, allowing them to correct mistakes in real-time and facilitating a more personalized learning experience. This aspect of interactive multimedia was highlighted by Komalasari & Rahmat (2019) and Primamukti & Farozin (2018), who found that real-time feedback is crucial for improving learning outcomes. Immediate feedback helps students recognize and rectify errors promptly, reinforcing correct usage and understanding of vocabulary.

The multimedia tools used in this study incorporated real-life contexts and practical applications of vocabulary, which helped students better understand and remember the words. This practical approach to learning is consistent with the findings of Kurniawan et al. (2020), who emphasized the importance of contextual learning in vocabulary acquisition. By linking vocabulary to real-world scenarios, students find it easier to comprehend and retain the meanings and uses of new words.

The significant improvement in the experimental group's post-test scores compared to the control group demonstrates that interactive multimedia is an effective tool for enhancing English vocabulary comprehension. The study's results provide empirical support for the integration of interactive multimedia in language education, suggesting that such tools can lead to better educational outcomes by making learning more engaging, interactive, and contextually relevant.

Overall, this research contributes to the growing body of evidence supporting the use of interactive multimedia in education, offering practical insights for educators seeking to improve vocabulary instruction through innovative teaching methods. By integrating multimedia tools into their teaching practices, educators can create a more engaging and effective learning environment that caters to the diverse needs and preferences of students.

### **Implications and Contributions**

The results of this study have several implications for the field of education, particularly in the context of English language learning. The significant improvement in vocabulary comprehension observed in the experimental group suggests that integrating interactive multimedia into the curriculum can be an effective strategy for enhancing students' language skills. This research contributes to the growing body of evidence supporting the use of technology-based learning media to improve educational outcomes. Educators and policymakers can leverage these findings to promote the adoption of interactive multimedia in classrooms, thereby improving the quality of English language education.

### **Limitations and Suggestions for Future Research**

This research has several limitations. The study focused on a specific set of indicators for vocabulary understanding, which may not comprehensively capture all aspects of vocabulary comprehension. Future research should consider including a broader range of indicators to provide a more holistic assessment of vocabulary skills. Additionally, the study's sample size was limited to two classes in a single school, which may affect the generalizability of the findings. Further research with larger and more diverse samples is needed to validate these results across different contexts.

Moreover, while this study demonstrated the effectiveness of interactive multimedia in improving vocabulary comprehension, it did not explore other potential benefits such as grammar understanding or speaking skills. Future studies should investigate the impact of interactive multimedia on these additional aspects of language learning to provide a more comprehensive understanding of its benefits.

In conclusion, the integration of interactive multimedia in English language learning shows promise as a method for enhancing vocabulary comprehension and overall educational outcomes. Continued research in this area is essential to fully understand the potential and limitations of this innovative approach to education.

### **CONCLUSION**

Interactive multimedia developed for English vocabulary learning significantly impacts students' vocabulary comprehension. The empirical evidence from this study demonstrates that interactive multimedia is effective in enhancing students' vocabulary skills, thus achieving the set learning objectives. The experimental group using interactive multimedia showed significantly better results compared to the control group, highlighting its efficacy in improving students' English vocabulary comprehension. This finding underscores the potential of interactive multimedia as a valuable tool in educational settings, particularly for language learning. Integrating such technology into the curriculum can provide a more engaging and effective learning experience, ultimately leading to improved educational outcomes.

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