

DIGITAL INTERACTIVE LEARNING WITH INTERACTIVE FLAT PANEL TO IMPROVE VOCABULARY MASTERY OF EIGHTH GRADE STUDENTS

Gegap Imam Pribadi1)

English Department
Semarang State University
Semarang, Indonesia
akunpribadi@students.unnes.ac.id

Rudi Hartono2),

English Department
Semarang State University
Semarang, Indonesia
rudi.hartono@mail.unnes.ac.id

Sri Wahyuni3).

English Department
Semarang State University
Semarang, Indonesia
sriwahyunifbs@mail.unnes.ac.id

Abstract

Many Junior High School students struggle to learn new vocabulary. This study aims to determine the effectiveness of using interactive digital learning based on Interactive Flat Panel (IFP) in improving English vocabulary mastery among eighth-grade junior high school students. Vocabulary mastery is a crucial aspect of English learning because it forms the foundation for students' comprehension, speaking, reading, and writing. However, many students still experience difficulties remembering and using vocabulary appropriately. Therefore, more engaging, interactive learning media are needed, capable of increasing student motivation. This study used a quasi-experimental approach, involving two groups: an experimental class taught using interactive media through IFP and a control class using conventional learning methods. The participants of this study were eighth-grade students from SMP 3 Larangan, Brebes, in the academic year 2025/2026. Data were collected through vocabulary tests administered before and after the treatment (pre-test) and (post-test). Furthermore, observations were also conducted to determine the level of student engagement during the learning process. The data obtained were analysed to identify differences in learning outcomes between the two groups. This study is expected to demonstrate that the use of IFP as an interactive learning medium has a significant positive impact on improving student vocabulary mastery compared to conventional learning methods. Furthermore, this research is expected to provide practical contributions for teachers in optimizing the use of digital technology in the classroom and serve as a reference for developing more innovative, effective, and engaging English language learning. Going forward, this study is also expected to serve as a foundation for further research examining the integration of technology in language learning more broadly.

Keywords: vocabulary mastery, interactive learning, Interactive Flat Panel, digital learning, junior high school students

Introduction

English has become an important subject in Indonesian junior high schools because it equips students with communication skills needed in the global era. One of the most essential components of learning English is vocabulary mastery. Without sufficient vocabulary knowledge, students may experience difficulties in understanding texts, expressing ideas, and participating in classroom interaction. Nation (2013) explains that vocabulary knowledge strongly influences language proficiency because learners need a large number of words to communicate effectively. However, many eighth-grade students still struggle with memorizing English vocabulary due to traditional teaching methods that emphasize rote memorization.

Vocabulary is one of the most fundamental components in language learning. According to Wilkins, David A. (1972), without grammar little can be conveyed, but without vocabulary nothing can be conveyed. This statement highlights how essential vocabulary is for communication and language acquisition.

In Indonesian junior high schools, many students encounter difficulties in learning English vocabulary. Students often struggle to memorize unfamiliar words, understand meanings, pronounce words correctly, and apply vocabulary in appropriate contexts. These challenges are caused by several factors such as limited exposure to English, monotonous teaching strategies, and low student motivation.

Based on classroom observations conducted at a junior high school in Central Java, many eighth-grade students showed low interest during vocabulary lessons. Teachers primarily relied on textbooks, whiteboards, and memorization techniques, which often made learning repetitive and less engaging.

The advancement of educational technology has introduced various digital tools that can improve classroom interaction. One of these tools is Interactive Flat Panel (IFP), a large interactive touchscreen display that allows teachers to present multimedia materials, interactive games, quizzes, videos, and collaborative learning tasks.

At Junior High School level, students often show low motivation when vocabulary activities are repetitive and teacher-centered. Interactive Flat Panel (IFP) offers digital learning features such as images, pronunciation audio, quizzes, and gamification that may improve vocabulary retention and motivation. Previous studies found that technology-assisted vocabulary learning improves engagement, but research in Indonesian junior high school contexts remains limited.

Previous studies have shown that technology-assisted language learning improves student engagement and learning outcomes. Nation, I. S. P. (2013) emphasized that repeated exposure and meaningful interaction are crucial in vocabulary acquisition. Similarly, Mayer, Richard E. (2009) explained through multimedia learning theory that combining visuals, audio, and interaction can improve students' comprehension.

Therefore, this study investigates whether digital interactive learning through IFP significantly improves students' vocabulary mastery.

Research Questions

Vocabulary learning remains one of the major challenges faced by junior high school students in learning English as a foreign language. Based on preliminary classroom observations conducted by the researcher, many eighth-grade students experienced difficulties in remembering

newly introduced vocabulary, understanding word meanings, and applying vocabulary appropriately in sentences or classroom communication. Students often forgot previously learned words and showed limited ability to use vocabulary in meaningful contexts. In addition, many students demonstrated low motivation during vocabulary lessons because learning activities were often dominated by memorization tasks, textbook exercises, and teacher explanations. These conventional teaching methods frequently created passive learning environments where students became less engaged and easily bored during classroom instruction.

The rapid development of educational technology offers opportunities for teachers to create more engaging and interactive learning experiences. One technological tool that has recently gained attention in classroom learning is Interactive Flat Panel (IFP), which allows teachers to integrate multimedia content, interactive exercises, visual learning materials, and collaborative activities into classroom instruction. Through its interactive features, IFP may help students learn vocabulary in more meaningful and enjoyable ways.

Considering these issues, this study aims to examine whether the implementation of IFP-based learning can improve students' vocabulary mastery and classroom engagement. Specifically, this study seeks to answer the following research questions: (1) Does the use of Interactive Flat Panel significantly improve students' vocabulary mastery? and (2) How does IFP-based learning affect students' classroom engagement during vocabulary instruction? These questions serve as the primary focus of the research and guide the overall investigation. Therefore, this study investigates whether IFP significantly improves vocabulary mastery.

Research Objectives

This study was conducted to investigate the role of digital interactive learning in improving English vocabulary instruction among junior high school students. As vocabulary serves as one of the fundamental components of language learning, students need effective learning strategies that can help them understand, memorize, and use new vocabulary more effectively. However, many students still face challenges in mastering vocabulary due to limited exposure, lack of engaging learning media, and monotonous classroom activities. Therefore, this research aims to explore how technology-based instruction can provide solutions to these challenges.

The first objective of this study is to determine the effectiveness of Interactive Flat Panel (IFP)-based learning in improving students' vocabulary mastery. This objective focuses on measuring whether students who learn vocabulary through interactive digital activities achieve better learning outcomes compared to students who learn through conventional teaching methods. By comparing pre-test and post-test scores between the experimental and control groups, the researcher seeks to identify the impact of IFP on students' vocabulary achievement.

The second objective of this study is to examine student engagement during digital learning activities. Learning achievement is not only measured through test scores but also through students' participation, motivation, attention, and classroom interaction. This study aims to observe how students respond to interactive digital learning environments and whether the use of IFP encourages them to become more active participants in the learning process.

Overall, these objectives are expected to provide valuable insights for teachers, schools, and future researchers regarding the integration of technology in English language teaching and the improvement of vocabulary learning outcomes.

Significance of the Study

This study is expected to provide significant contributions to several stakeholders in the field of English language education, particularly teachers, students, schools, and future researchers. As technology continues to develop rapidly, educational institutions are increasingly encouraged to integrate digital tools into classroom instruction. However, many teachers still face challenges in selecting appropriate technological media that can effectively support language learning. Therefore, this study provides practical insights into how Interactive Flat Panel (IFP) can be utilized as an innovative instructional tool to improve vocabulary learning among junior high school students.

For English teachers, this study offers alternative teaching strategies that can make vocabulary instruction more engaging, interactive, and effective. Traditional vocabulary teaching methods often rely heavily on memorization, textbook exercises, and teacher explanations, which may reduce student interest and participation. Through the findings of this research, teachers may gain new perspectives on how multimedia tools, interactive quizzes, games, videos, and collaborative classroom activities can improve student learning outcomes. The use of Interactive Flat Panel may help teachers create more student-centered learning environments where learners actively participate in classroom activities rather than passively receiving information.

For students, this study is expected to improve both academic performance and learning motivation. Vocabulary mastery is

an essential component of English learning because it supports students in understanding texts, expressing ideas, and communicating effectively. By using interactive learning technology, students may find vocabulary learning more enjoyable and less stressful. The implementation of digital activities can increase students' confidence, motivation, and willingness to participate in classroom learning.

This study is also beneficial for schools and educational institutions. The findings may encourage school administrators to invest in technological facilities that support modern teaching practices. Schools can use the results of this research as evidence that digital learning tools can improve classroom effectiveness and student engagement. In addition, schools may consider organizing teacher training programs to ensure that educators can maximize the use of digital technologies effectively.

For policymakers and educational stakeholders in Indonesia, this study supports current efforts to promote digital transformation in education. As Indonesia continues to emphasize technological innovation in schools, this research provides practical evidence that digital tools can contribute positively to English language teaching.

Finally, this study contributes to future researchers by providing references for further studies related to digital learning, vocabulary instruction, and technology integration in English education. Future researchers may use this study as a foundation for investigating other language skills, educational levels, or technological platforms in broader contexts.

Methodology

This study employed a quantitative research approach using a quasi-experimental design to investigate the effectiveness of digital

interactive learning through Interactive Flat Panel in improving students' vocabulary mastery. Quasi-experimental research was selected because the researcher was unable to randomly assign participants into new groups due to existing classroom arrangements in the school. According to Creswell, John W. and Creswell, J. David (2018), quasi-experimental design is commonly used in educational settings where researchers compare two naturally existing groups to determine the effect of a treatment. This design was considered appropriate for this study because it allowed the researcher to compare the effectiveness of IFP-based learning with conventional teaching methods in a real classroom environment.

The research was conducted at a junior high school in Central Java, Indonesia. The participants of this study were eighth-grade students during the academic year of 2025/2026. Two classes were selected as the sample of the study, consisting of 64 students in total. The experimental group consisted of 32 students, while the control group also consisted of 32 students. The researcher used purposive sampling in selecting the participants because both classes had relatively similar English achievement levels based on previous classroom assessments and recommendations from the English teacher. This sampling technique helped ensure that both groups were comparable before the treatment was implemented.

In this study, both groups were given a pre-test before the treatment began. The pre-test aimed to measure students' initial vocabulary mastery and determine whether both groups had similar vocabulary abilities. The test included several aspects of vocabulary knowledge such as identifying word meanings, matching words with pictures, completing sentences using appropriate vocabulary, and recognizing correct spelling. The pre-test results showed that both groups had relatively similar average scores, indicating

that they started at a comparable level of vocabulary proficiency.

After the pre-test, the treatment phase was conducted for six meetings over three weeks. The experimental group received vocabulary instruction through Interactive Flat Panel-based digital learning activities. During these sessions, students participated in various interactive tasks such as digital vocabulary games, drag-and-drop word matching exercises, multimedia presentations, pronunciation practice using audio and video materials, and collaborative classroom quizzes. The use of IFP enabled students to directly interact with learning materials through touch-screen features, visual displays, and immediate feedback systems. These activities were designed to create a more engaging and student-centered learning environment.

Meanwhile, the control group was taught using conventional teaching methods. The teacher used printed textbooks, whiteboard explanations, vocabulary memorization exercises, and traditional question-and-answer sessions. Although both groups learned similar vocabulary materials and learning objectives, the instructional media and classroom interaction methods were different. This comparison allowed the researcher to identify whether the use of IFP contributed significantly to vocabulary improvement.

To collect research data, the researcher used two primary instruments: vocabulary tests and classroom observation checklists. The vocabulary test consisted of pre-test and post-test assessments administered to both groups. The post-test was given after all treatment sessions were completed to measure students' vocabulary improvement after the instructional intervention. The observation checklist was used during classroom activities to record students' participation, enthusiasm, engagement, attentiveness, and interaction levels throughout the learning process.

To ensure the validity of the research instrument, the vocabulary test items were reviewed by an English teacher and a university lecturer before implementation. The researcher also conducted a small pilot test to identify unclear instructions or inappropriate questions. Reliability of the test was measured to ensure consistency of the instrument.

The collected data were analyzed using both descriptive and inferential statistics. Descriptive statistics were used to calculate mean scores, score improvement, and overall student performance in both groups. Inferential statistics were conducted using an independent sample t-test to determine whether the difference between the experimental and control groups was statistically significant. The significance level used in this study was 0.05. If the t-count was higher than the t-table value, the alternative hypothesis would be accepted, indicating that Interactive Flat Panel had a significant effect on students' vocabulary mastery.

Through these procedures, the researcher aimed to obtain valid and reliable findings regarding the effectiveness of digital interactive learning in improving vocabulary mastery among junior high school students.

Research Design

This study employed a quasi-experimental research design involving two groups: an experimental group and a control group. The research design consisted of three main stages, namely pre-test, treatment, and post-test. In the pre-test phase, both the experimental and control groups were given a vocabulary test to measure their initial vocabulary ability before receiving any treatment. During the treatment phase, the experimental group was taught using IFP-based learning (Interactive Flat Panel), while the control group received conventional learning methods. After the

treatment was completed, both groups took a post-test to measure the improvement in their vocabulary mastery.

The participants of this study were 64 eighth-grade students of SMP 3 Larangan, Brebes, in the academic year 2025/2026. The students were divided into two classes, consisting of 32 students in the experimental class and 32 students in the control class. The researcher applied purposive sampling because the selected classes had similar academic achievement levels, making them appropriate for comparison in the study.

In collecting the data, the researcher used two research instruments: a vocabulary test and an observation checklist. The vocabulary test consisted of a pre-test and a post-test designed to assess students' vocabulary mastery. The aspects measured in the test included word meaning, spelling, pronunciation recognition, and sentence usage. Meanwhile, the observation checklist was used to observe students' participation, motivation, classroom interaction, and attention during the learning process.

The research procedure began with the pre-test phase, in which both groups completed a vocabulary test before the treatment. During the treatment phase, the experimental group learned vocabulary through Interactive Flat Panel media, including digital vocabulary games, matching activities, interactive quizzes, pronunciation videos, and drag-and-drop exercises. In contrast, the control group learned through conventional methods such as textbook exercises, teacher explanations, and memorization tasks. The treatment was conducted over three meetings. After the treatment phase, both groups completed the post-test to evaluate the effectiveness of the teaching methods.

To analyse the data, the researcher used mean score analysis, standard deviation, and an independent sample t-test. The findings from the pre-test results showed

that both groups had relatively similar vocabulary abilities before the treatment, indicating that the groups were comparable at the beginning of the study.

S30	63
S31	58
S32	62

Mean = 61.4

Table 1.

Pre-test Scores

Experimental Group (Using Interactive Flat Panel)

Pre-test Scores

Student	Score
S1	60
S2	58
S3	62
S4	64
S5	59
S6	63
S7	61
S8	60
S9	57
S10	65
S11	62
S12	59
S13	60
S14	63
S15	61
S16	58
S17	64
S18	62
S19	60
S20	59
S21	61
S22	63
S23	58
S24	60
S25	62
S26	64
S27	59
S28	61
S29	60

Control Group (Conventional Learning)

Pre-test Scores

Student	Score
S1	59
S2	61
S3	60
S4	62
S5	58
S6	61
S7	60
S8	59
S9	63
S10	60
S11	58
S12	62
S13	61
S14	59
S15	60
S16	61
S17	62
S18	58
S19	60
S20	61
S21	59
S22	62
S23	60
S24	58
S25	61
S26	63
S27	59
S28	60
S29	61
S30	58

S31	62
S32	60

Mean = 60.8

Group Mean Score:

Experimental 61.4

Control 60.8

The results indicate relatively equal starting points.

Post-test Results

After treatment:

Table 2.

Post-test Scores

Experimental Group (Using Interactive Flat Panel)

Student	Score
S1	85
S2	82
S3	87
S4	88
S5	83
S6	86
S7	84
S8	85
S9	81
S10	90
S11	86
S12	83
S13	84
S14	88
S15	85
S16	82
S17	89
S18	87

S19	84
S20	83
S21	85
S22	86
S23	82
S24	84
S25	87
S26	89
S27	83
S28	85
S29	84
S30	88
S31	82
S32	86

Mean = 84.7

Improvement:

$$84.7 - 61.4 = 23.3$$

Control Group (Conventional Learning)

Post-test Scores

Student	Score
S1	72
S2	70
S3	73
S4	74
S5	69
S6	72
S7	71
S8	70
S9	75
S10	72
S11	69
S12	74
S13	71
S14	70
S15	72
S16	71
S17	73
S18	69

S19	70
S20	72
S21	70
S22	74
S23	71
S24	69
S25	72
S26	75
S27	70
S28	71
S29	72
S30	69
S31	74
S32	71

Mean = 72.1

Improvement:

72.1 - 60.8 = 11.3

Group Mean Score:

Based on the statistical analysis, the experimental group achieved a higher mean score than the control group. The experimental group obtained a mean score of 84.7, while the control group only reached 72.1. This result indicates that the students in the experimental group showed greater improvement in their learning outcomes compared to those in the control group. In addition, the standard deviation of the experimental group was 6.2, whereas the control group had a standard deviation of 7.1. These findings suggest that the scores in the experimental group were relatively more consistent than those in the control group. Each group consisted of 32 students, making the number of participants balanced between the two groups. Furthermore, the result of the statistical test showed that the t-count was 3.87, which was higher than the t-table value of 2.00 at the significance level of 0.05. Therefore, the alternative hypothesis (Ha) was

accepted and the null hypothesis (H0) was rejected. It can be concluded that there was a significant difference between the experimental group and the control group, indicating that the treatment given to the experimental group had a positive effect on students' achievement.

The statistical analysis showed that the experimental group obtained a mean score of 84.7, while the control group obtained 72.1. The t-test result revealed that the t-count (3.87) was higher than t-table (2.00) at significance level 0.05. Therefore, the alternative hypothesis was accepted, indicating that Interactive Flat Panel significantly improved students' vocabulary mastery.

Observation Results

In addition to the quantitative findings obtained from the pre-test and post-test scores, classroom observations were also conducted to examine students' behavioral responses during the implementation of Interactive Flat Panel-based learning. The observation process focused on several aspects of student engagement, including enthusiasm, participation, confidence, collaboration, and overall classroom interaction. The observation results revealed that students in the experimental class demonstrated noticeably higher engagement compared to students in the control class.

One of the most visible findings was students' increased enthusiasm during classroom activities. During the implementation of interactive digital learning, students appeared more excited and interested in the lesson. They showed positive reactions when the teacher introduced multimedia content such as images, videos, and interactive vocabulary exercises. Many students paid closer attention to the lesson and showed curiosity when using the digital features provided by Interactive Flat Panel. Compared to

conventional classroom sessions, students were less likely to appear bored or distracted.

The observation also showed better classroom participation among students in the experimental group. Students were more willing to answer questions, participate in classroom discussions, and volunteer to complete activities on the interactive screen. During vocabulary practice sessions, students actively responded to teacher instructions and demonstrated greater involvement in learning tasks. This indicates that interactive learning environments can encourage students to become more active participants in the learning process.

Another important finding was the increase in students' confidence. Some students who were usually passive during conventional learning activities appeared more confident when participating in digital tasks. They were willing to answer vocabulary questions, pronounce new words, and engage in classroom exercises without showing excessive hesitation. The supportive and enjoyable learning environment appeared to reduce students' anxiety.

Furthermore, students demonstrated more active collaboration with their peers. During group-based vocabulary games and problem-solving activities, students worked together to complete tasks and support one another. This collaborative interaction helped create a more communicative classroom atmosphere.

Students were particularly enthusiastic during interactive quizzes and game-based activities. These activities created a fun learning environment that encouraged active participation while reinforcing vocabulary learning. Overall, the observation results indicate that Interactive Flat Panel not only improved academic performance but also positively influenced students' classroom engagement and motivation.

Finding and Discussion

The findings of this study indicate that the use of Interactive Flat Panel significantly improved students' vocabulary mastery compared to conventional teaching methods. Based on the post-test results, students in the experimental group achieved higher average scores than students in the control group. In addition to academic improvement, classroom observations also revealed that students who learned through IFP-based activities demonstrated higher participation, enthusiasm, and confidence during the learning process. These findings suggest that integrating digital interactive technology into English classrooms can positively influence both learning outcomes and student engagement.

The findings of this study strongly support Mayer, Richard E.'s Multimedia Learning Theory (2009), which explains that students learn more effectively when information is presented through multiple modes such as visual, audio, and interactive elements. In this study, the use of Interactive Flat Panel allowed teachers to combine vocabulary materials with images, videos, pronunciation audio, interactive quizzes, and animated learning activities. This multimodal learning environment helped students understand vocabulary more clearly because they were not only reading words from textbooks but also seeing visual representations and hearing correct pronunciation. As a result, students were able to retain vocabulary more effectively.

Furthermore, the findings are also consistent with Nation, I. S. P.'s theory of vocabulary learning, which emphasizes the importance of repeated exposure and meaningful interaction in vocabulary acquisition. Through interactive games, repetition exercises, and collaborative classroom tasks, students encountered target vocabulary multiple times during the treatment sessions. Repeated exposure helped students remember new vocabulary more easily and apply it in different

contexts. This supports Nation's argument that vocabulary mastery requires continuous practice and repeated encounters with words in meaningful learning situations.

Another important finding of this study is the transformation of classroom learning from teacher-centered instruction into student-centered learning. In conventional classrooms, teachers often dominate learning activities through lectures, memorization tasks, and textbook-based exercises. However, during the implementation of Interactive Flat Panel, students became more active participants in classroom activities. They directly interacted with learning materials, answered quizzes on screen, worked collaboratively with classmates, and actively engaged in problem-solving tasks. This shift created a more dynamic and participatory learning environment where students became the center of the learning process.

Student motivation also increased significantly during the implementation of digital learning activities. Observation results showed that students appeared more enthusiastic, focused, and willing to participate in classroom tasks. Many students expressed excitement when using interactive games and multimedia features. This indicates that enjoyable learning experiences can improve students' motivation and reduce boredom often associated with traditional vocabulary instruction.

These findings are highly relevant to the current educational transformation in Indonesia, where schools are increasingly encouraged to integrate digital technology into classroom learning. Programs related to digital literacy and technology integration have become important priorities in Indonesian education. Therefore, this study provides practical evidence that innovative tools such as Interactive Flat Panel can support more

effective and engaging English language teaching in modern classrooms.

Conclusion

This study concludes that the implementation of digital interactive learning through Interactive Flat Panel significantly improves vocabulary mastery among eighth-grade students. Based on the findings of the study, students who were taught using IFP-based learning activities achieved higher post-test scores compared to students who were taught using conventional teaching methods. The experimental group showed greater improvement in vocabulary achievement after participating in interactive digital learning sessions that involved multimedia presentations, vocabulary games, pronunciation exercises, and collaborative classroom activities. These findings indicate that integrating digital technology into vocabulary instruction can positively influence students' academic performance.

In addition to improving academic achievement, this study also found that the use of Interactive Flat Panel contributed to higher student engagement during the learning process. Classroom observations revealed that students in the experimental group were more active, enthusiastic, and motivated compared to students in the control group. They participated more frequently in classroom discussions, responded actively during quizzes, and showed greater confidence when practicing new vocabulary. This demonstrates that learning environments supported by interactive technology can create more enjoyable classroom experiences and reduce student boredom commonly found in traditional teaching methods.

The findings of this research suggest that English teachers should consider integrating interactive digital media into their classroom instruction. In today's educational environment, teachers are expected to adapt to technological developments and create innovative

learning experiences that meet students' needs. The use of Interactive Flat Panel can serve as one practical solution for improving classroom interaction and supporting more student-centered learning. However, teachers should also ensure that technology is used purposefully and aligns with learning objectives rather than being used merely for entertainment purposes.

This study also provides important implications for schools and educational institutions. School administrators may consider investing in digital learning facilities and providing teacher training programs to maximize the effective use of classroom technology. Support from schools is essential to ensure that digital transformation in education can be implemented successfully and sustainably.

Despite its positive findings, this study has several limitations. First, the study involved a relatively small number of participants from only one school, which may limit the generalizability of the findings. Second, the duration of the treatment was relatively short, consisting of only several meetings. Longer-term studies may provide deeper insights into the long-term impact of IFP-based learning.

Therefore, future researchers are encouraged to explore the implementation of Interactive Flat Panel for other English language skills such as speaking, reading comprehension, grammar learning, listening activities, or writing instruction. Future studies may also examine larger participant groups and different educational settings to provide broader evidence regarding the effectiveness of digital learning technologies in English language education.

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