

Interactive Digital Learning Media and Student Motivation in Technology-Enhanced Senior High School Classrooms

Novi Nirmayanti*, Basri Massoeang, Syamsuria

Muhammadiyah University of Bone, Bone, 92716, Indonesia

Abstract

The rapid development of digital technology has transformed educational practices by encouraging the integration of interactive digital learning media to create more engaging and student-centered learning environments. Despite its increasing use in schools, empirical evidence regarding its influence on students' learning motivation in regular classroom settings remains limited. This study aimed to examine the effect of interactive digital learning media on the learning motivation of eleventh-grade students at UPT SMA Negeri 12 Bone. A quantitative approach with an ex post facto research design was employed. The study involved a population of 232 students, from which 32 respondents were selected using purposive sampling. Data were collected through questionnaires and documentation, and the research instruments were tested for validity and reliability prior to data collection. The data were analyzed using descriptive statistics and simple linear regression. The findings indicated that the use of interactive digital learning media had a positive and statistically significant effect on students' learning motivation. Furthermore, the coefficient of determination revealed that interactive digital learning media explained 58.2% of the variance in students' learning motivation, while the remaining 41.8% was influenced by other factors not included in the research model. These findings suggest that the effective implementation of interactive digital learning media can foster students' motivation by promoting active participation, meaningful learning experiences, and greater engagement during the learning process. Therefore, integrating interactive digital learning media into classroom instruction can serve as an effective strategy for enhancing students' learning motivation and supporting the implementation of technology-based learning in secondary education.

Keywords: Interactive Digital Learning Media, Learning Motivation, Ex Post Facto, Quantitative Research, Senior High School

1. Introduction

The development of digital technology has driven transformations in various aspects of life, including the education sector. The use of technology in learning no longer serves only as a means for delivering information, but also as a medium capable of creating learning experiences that are more interactive, flexible, and centered on learners (Marsellia Nuri, Annatia Azzahra, 2024). This shift in learning paradigms requires teachers to integrate technology effectively so that the learning process is not only oriented toward delivering subject matter, but also able to increase students' engagement and learning motivation. In this context, interactive digital learning media is one innovation considered capable of addressing the needs of 21st-century learning because it combines various multimedia elements, such as text, images, audio, video, animation, and interactive features that allow students to interact directly with learning materials (Chusna et al., 2024).

Learning motivation is one of the psychological factors that plays an important role in determining the success of the learning process. Students with high motivation tend to show greater attention, actively participate in learning activities, have perseverance in completing assignments, and strive to achieve optimal learning outcomes. In contrast, low learning motivation is often associated with students' lack of involvement during instruction and low interest in exploring learning materials, as well as the decline in academic achievement. According to Hamzah B. Uno, as cited in (Prayoga et al., 2021), learning motivation is reflected through six indicators, namely the desire to succeed, the drive and needs in learning, expectations for the future, recognition in learning, interest in learning activities, and the creation of a conducive learning environment. Therefore, efforts to increase learning motivation have become one of the main focuses in the development of learning strategy in schools.

One approach considered capable of increasing learning motivation is the use of interactive digital learning media. This media allows students not only to receive information passively, but also to be actively involved through various

* Corresponding author.

E-mail address: novinirmayanti@gmail.com (Novi Nirmayanti)

activities, such as answering quizzes, exploring learning materials, obtaining direct feedback, and regulating their study pace according to each individual's needs. These characteristics align with Carl Rogers' view of learner-centered learning, which emphasizes the importance of active involvement, meaningful learning experiences, and independence in constructing knowledge. Thus, interactive digital learning media not only functions as a learning aid, but also as a learning environment that can facilitate interaction, exploration, and the development of students' intrinsic motivation (Livia Yulvani Akmal et al., 2025).

Various prior studies have shown that the use of interactive digital learning media has a positive impact on students' learning motivation. (Chusna et al., 2024) report that the integration of interactive multimedia can increase students' engagement through presenting material that is more interesting and interactive. The study (Eka Ariaty et al., 2025) also found that interactive digital media significantly affects learning motivation among secondary school students, especially in the aspects of attention, relevance of the material, and student engagement. Similar results were reported by (Surbakti & Chantrin, 2025; Usman et al., 2025; Raynaldi et al., 2025), indicating that the use of interactive digital media can enhance students' enthusiasm, participation, and learning motivation across various educational levels.

Even so, most previous research still focuses on testing the effectiveness of interactive digital media in the context of schools or different educational levels, the use of particular types of media, and experimental learning design. In addition, some studies focus more on improving students' learning outcomes or their perceptions of digital media rather than analyzing the relationship between the characteristics of using interactive digital learning media and students' learning motivation in regular classroom instruction. On the other hand, the implementation of digital learning media across various schools is also influenced by learning environment conditions, teachers' readiness, learners' characteristics, and the facilities available, so the results of previous studies are not necessarily generalizable to all educational contexts. These conditions indicate that there is still room for research to strengthen empirical evidence regarding the relationship between the use of interactive digital learning media and students' learning motivation in the context of upper secondary schools.

Based on this gap, this study offers a contribution in the empirical aspect by examining the effect of using interactive digital learning media on students' learning motivation in Grade XI at SMA Negeri 12 Bone. Unlike previous studies that largely focused on the effectiveness of a particular medium or used experimental designs, this study examines the use of interactive digital learning media as implemented in everyday learning processes through a quantitative *ex post facto* approach. Thus, this study provides an overview of how the quality of the use of interactive digital media that has been implemented in schools is related to students' learning motivation levels in real learning conditions. The findings of this study are expected to enrich empirical evidence regarding the implementation of interactive digital learning media at the senior high school level while also providing a basis for teachers to optimize the use of technology to increase learning motivation.

Based on the description above, this study aims to analyze the effect of using interactive digital learning media on the learning motivation of students in Grade XI at State Senior High School 12 Bone. The research results are expected not only to contribute to the development of studies on technology-based learning, but also to serve as considerations for educators and schools in designing learning that is more interactive, participatory, and capable of increasing students' learning motivation.

2. Literature Review

2.1. Learning Motivation

Learning motivation is one of the internal factors that plays an important role in determining the success of the learning process. Motivation encourages students to start, maintain, and direct their learning activities in order to achieve the predetermined learning objectives. Students with high learning motivation tend to show enthusiasm in participating in learning, actively take part in discussions, have perseverance in completing assignments, and are able to persist when facing learning difficulties. In contrast, low learning motivation is often associated with students' lack of involvement during the learning process, low interest in exploring the material, and a decline in learning outcomes (Muattar Gaffarovna Milieva, 2025).

According to Hamzah B. Uno as cited in (Prayoga et al., 2021), learning motivation can be identified through six main indicators: the desire and will to succeed, drive and needs in learning, hopes and future aspirations, recognition in learning, interesting learning activities, and a conducive learning environment. These six indicators show that learning

motivation is not only influenced by students' internal factors, but also by learning experiences obtained during the learning process.

From a constructivist learning perspective, motivation develops when learners are given the opportunity to actively participate in building their own knowledge through meaningful learning experiences. Therefore, the learning process that provides space for students to interact, explore the material, obtain feedback, and learn independently is believed to be able to increase intrinsic motivation and encourage students' optimal involvement in learning.

2.2. Interactive Digital Learning Media

The development of information technology has driven changes in the use of learning media—from merely a tool for delivering information to a means capable of creating a more active and meaningful learning experience. Interactive digital learning media are technology-based media that integrate various multimedia elements, such as text, images, audio, video, animations, and interactive features that allow students to engage directly with the learning material (Mungfarida et al., 2025). Through such interaction, students are not only passive recipients of information, but also involved in the process of exploration, making decisions, and evaluating the results of their learning.

Interactive digital learning media provide flexibility for students to access content according to their needs, abilities, and individual learning pace (Dhiya Rahma et al., 2024). Meanwhile, a combination of various multimedia elements with interactive features can create a more engaging learning experience, helping students understand concepts more effectively than conventional delivery (Setyaningsih, 2023).

Theoretically, the use of interactive digital learning media aligns with the learner-centered learning theory proposed by Carl Rogers. This theory places students at the center of learning, while teachers act as facilitators who create a conducive learning environment so students can build knowledge through their own learning experiences. Thus, interactive digital learning media not only function as learning aids, but also as a learning environment that encourages independence, active participation, and students' involvement in every stage of the learning process (Amarullah & Wiwita, 2024).

The quality of interactive digital learning media can be identified through five main characteristics, namely the presence of two-way interactivity, the media's ability to adapt to students' learning styles and learning speed, provision of direct feedback, integration of various forms of digital media, and the media's ability to encourage students' independence and active participation. These characteristics make interactive digital learning media one of the learning innovations capable of creating more engaging, responsive, and learner-centered learning experiences.

2.3. The Relationship Between Interactive Digital Learning Media and Learning Motivation

Conceptually, interactive digital learning media has the potential to increase learning motivation because it can create more engaging, interactive learning experiences that are oriented to learners' needs. The use of various multimedia elements, the presentation of adaptive material, and the provision of direct feedback enable students to gain more meaningful learning experiences, thereby increasing their attention, curiosity, self-confidence, and involvement throughout the learning process.

The relationship has been supported by various empirical studies. (Chusna et al., 2024) state that interactive digital learning media can increase students' engagement and learning motivation through the presentation of material that leverages multiple multimedia channels. Research conducted by (Eka Ariaty et al., 2025) also shows that the use of interactive digital media has a positive effect on students' learning motivation, especially in enhancing attention, the relevance of the material, and students' engagement during learning. Similar findings were reported by (Surbakti & Chantrin, 2025; Usman et al., 2025; Raynaldi et al., 2025), which consistently report that the use of interactive digital learning media contributes positively to improving students' learning motivation across various education levels.

Even so, most of the previous research has focused more on the effectiveness of using certain digital media or on using experimental designs to compare learning outcomes before and after the treatment. Studies that analyze the relationship between the use of interactive digital learning media, as applied in regular classroom instruction, and students' learning

motivation at the senior high school level are still relatively limited. This condition indicates that there is still an opportunity to strengthen empirical evidence regarding the contribution of interactive digital learning media to students' learning motivation in the context of real classroom learning that takes place at school

Based on the theoretical foundation and the results of previous research, this study assumes that the better the use of interactive digital learning media in the learning process, the higher students' learning motivation will be. This assumption serves as the conceptual basis for examining the effect of interactive digital learning media on the learning motivation of students in grade XI at SMA Negeri 12 Bone.

3. Research Methods and Materials

This study uses a quantitative approach with an associative causal research type and an ex-post facto design. This design was chosen because the research aims to analyze the effect of using interactive digital learning media on students' learning motivation without providing treatment or manipulation of the independent variable. The researcher observes phenomena that have naturally occurred, then analyzes the relationships among variables based on empirical data obtained from respondents (Sugiyono, 2023).

The research was conducted at UPT SMA Negeri 12 Bone, Bone Regency, South Sulawesi, in the 2025/2026 academic year. The selection of the research location is based on the implementation of interactive digital learning media in the learning process, so it is in line with the research objectives.

The study population is all students of class XI at UPT SMA Negeri 12 Bone, totaling 232 students. The research sample consists of 32 students from class XI-1, determined using a purposive sampling technique. This technique was chosen because the sample is determined based on certain considerations, namely the class that assessed as representative of the research objectives and provides access to the use of interactive digital learning media during the learning process.

This research involves two variables, namely the use of interactive digital learning media as the independent variable (X) and students' learning motivation as the dependent variable (Y). The variable of using interactive digital learning media is measured based on aspects of interactivity, the media's ability to adapt to students' learning needs, providing direct feedback, integrating various multimedia elements, and the media's ability to encourage active student participation. Meanwhile, learning motivation is measured based on indicators proposed by Hamzah B. Uno in (Prayoga et al., 2021), including the desire to achieve, encouragement and needs in learning, hopes and future aspirations, rewards in learning, interesting learning activities, and a conducive learning environment.

Data collection was carried out using closed-ended questionnaires developed based on the indicators of each variable and measured using a five-point Likert scale, ranging from strongly disagree to strongly agree. In addition, documentation was used as a supporting technique to obtain information about school conditions, the number of students, and other data related to the implementation of the research.

Before being used as a research instrument, the questionnaire was first tested for validity and reliability. The validity test was conducted using Pearson's Product Moment correlation by comparing the calculated r value with the r table value at a significance level of 5%. All statement items were declared valid because they have calculated r values greater than the r table value. Next, the reliability test was carried out using Cronbach's Alpha coefficient. The results of the testing show that the variable on the use of interactive digital learning media obtained a Cronbach's Alpha value of 0.694, while the learning motivation variable obtained a value of 0.772. Both values exceed the minimum threshold of 0.60, so the instrument is considered reliable and has good consistency for use in the research.

The research procedure begins with preparing the research instrument and arranging the research permits at the school. The next stage is data collection by distributing questionnaires to respondents according to the research sample. After all data have been collected, a process of checking the completeness of answers, coding the data, and processing the data using statistical software is carried out before analysis.

Data analysis was conducted through descriptive statistics to describe the characteristics of the research data; then a simple linear regression analysis was carried out to test the effect of using interactive digital learning media on students'

learning motivation. Hypothesis testing was based on the significance value with an error tolerance of 5% ($\alpha = 0.05$). In addition, the coefficient of determination (R^2) was used to determine the extent of the contribution of the use of interactive digital learning media in explaining variations in students' learning motivation.

4. Results and Discussion

4.1. Research Instrument Testing

Before conducting hypothesis testing, the research instruments were first tested for validity and reliability to ensure that the questionnaire could measure the research variables appropriately and consistently.

The results of the validity test show that all items of the variables concerning the use of interactive digital learning media and students' learning motivation meet the validity criteria. All values of the correlation coefficient for each item are greater than the r table value, so all items are declared valid and suitable for use as instruments for data collection. Therefore, all indicators of the two variables are able to represent the constructs being measured and can be used in the next stage of analysis.

Furthermore, the results of the reliability test show that the research instrument has a good level of consistency. The variable of the use of interactive digital learning media obtained a Cronbach's Alpha value of 0.694, while the variable of students' learning motivation obtained a Cronbach's Alpha value of 0.772. Both values are above the minimum reliability limit (0.60), so all instruments are declared reliable and suitable for use in the study.

4.2. Analysis of Simple Linear Regression

Hypothesis testing was conducted using simple linear regression analysis to determine the effect of the use of interactive digital learning media on students' learning motivation. The results of the analysis produced the following regression equation:

$$Y = 5,315 + 0,833X$$

The equation shows a positive relationship between the use of interactive digital learning media and students' learning motivation. The positive regression coefficient indicates that an increase in the use of interactive digital learning media is followed by an increase in students' learning motivation. In addition, the testing results show a significance value of 0.000, which is smaller than the significance level of 0.05, so the research hypothesis is accepted. Therefore, the use of interactive digital learning media has been proven to have a significant effect on the learning motivation of students in class XI at UPT SMA Negeri 12 Bone.

4.3. Coefficient of Determination

The magnitude of the contribution of using interactive digital learning media to students' learning motivation was analyzed using the coefficient of determination (R^2). The analysis results show an R Square value of 0.582. These findings indicate that the use of interactive digital learning media is able to explain 58.2% of the variation in students' learning motivation, while the remaining portion is influenced by other factors not included in the research model.

Overall, the instrument testing results indicate that the research data meet the requirements for validity and reliability. Next, the regression analysis results show that there is a significant influence of using interactive digital learning media on students' learning motivation, with a contribution classified as quite large based on the coefficient of determination.

4.4. Discussion

The research findings show that the use of interactive digital learning media has a positive and significant effect on students' learning motivation. These findings indicate that the more optimally interactive digital learning media is used in the learning process, the higher students' learning motivation will be. This occurs because interactive digital media can create a more engaging learning experience by integrating text, images, audio, video, and interactive features that

encourage students' active involvement. The findings are in line with Carl Rogers' learner-centered learning theory, which places students at the center of learning, while teachers act as facilitators who create an active and meaningful learning environment. In addition, this research also supports the learning motivation indicators proposed by Hamzah B. Uno in (Prayoga et al., 2021), namely that learning motivation can increase when students gain engaging learning experiences, receive feedback, and learn in a supportive environment.

These research findings are consistent with research (Chusna et al., 2024) which states that interactive digital learning media can increase students' learning engagement and motivation by presenting material in a more engaging way. Similar results were also reported by (Eka Ariaty et al., 2025; Surbakti & Chantrin, 2025; Usman et al., 2025; Rayna ldi et al., 2025), showing that the use of interactive digital media has a positive effect on learning motivation across various educational levels. The similarity of this study with previous research lies in the presence of a positive influence of interactive digital learning media on learning motivation. However, this study differs because it uses an ex post facto approach to analyze the use of media that has already been implemented in regular learning, rather than through an experimental design that provides treatment to respondents. Thus, this study provides empirical evidence regarding the effect of interactive digital learning media in learning conditions that occur realistically in schools.

The findings of this study imply that the use of interactive digital learning media needs to be optimized as part of a learning strategy to increase students' learning motivation. Nevertheless, learning motivation is not only influenced by the use of media, but also by other factors, such as learning strategies, the learning environment, and students' characteristics. The contribution of this research lies in providing empirical evidence regarding the effect of interactive digital learning media on students' learning motivation at the upper secondary school level. As for the novelty of this study, it lies in analyzing the use of interactive digital learning media in regular instruction through an ex post facto approach, thereby offering a more contextual perspective on the implementation of digital media in enhancing students' learning motivation in naturally occurring learning situations.

5. Conclusion

This study aims to analyze the effect of using interactive digital learning media on the learning motivation of students in grade XI at UPT SMA Negeri 12 Bone. Based on the results of the analysis and discussion, it can be concluded that the use of interactive digital learning media contributes to increasing students' learning motivation. These findings indicate that the use of interactive digital media can create a more engaging learning experience, encourage active participation, and support the creation of a student-centered learning process.

The contribution of this study lies in providing empirical evidence regarding the relationship between the use of interactive digital learning media and students' learning motivation in the context of regular instruction through an ex post facto approach. The results of the study provide practical implications for teachers and schools to optimize the use of interactive digital learning media as part of a learning strategy capable of increasing students' engagement and learning motivation.

This study has limitations because it involves only one school with a relatively limited sample size and examines only one independent variable, so the findings cannot yet be generalized to a broader context. Therefore, future research is recommended to involve larger and more diverse samples, covering different grade levels or regions, and to consider other variables that may influence learning motivation, such as teacher competence, the learning environment, digital literacy, or technology-based learning strategies. Thus, the study results are expected to provide a more comprehensive understanding of the factors that influence students' learning motivation in the era of digital learning.

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