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The Influence of Using Android-Based Interactive Learning Applications on Student Learning Motivation

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Abstract −The use of technology in education has grown rapidly, one of which is the existence of Android-based interactive learning applications. This study aims to analyze the influence of the use of Android-based interactive learning applications on students' learning motivation. The study was conducted on randomly selected high school students, with a total of 100 respondents. The research method used is quantitative with an experimental approach, where groups of students using this application are compared with groups using conventional learning methods. Data were collected through a learning motivation questionnaire adapted from the ARCS (Attention, Relevance, Confidence, Satisfaction) learning motivation theory and analyzed using statistical tests. The results of the study showed that the use of Android-based interactive learning applications significantly increased students' learning motivation compared to conventional methods. This application is able to attract students' attention, increase the relevance of the material to their experiences, and provide confidence in understanding the concepts being studied. In addition, students feel more satisfied and motivated to learn independently through the application. These findings indicate that the use of Android-based applications has the potential to be an effective tool in increasing students' learning motivation, which can support more interactive and engaging learning in this digital era.

Keywords: Interactive learning applications , Android , Learning motivation, Digital education, ARCS, Learning methods

Introduction

In this rapidly developing digital era, technology has become an inseparable part of everyday life, including in the world of education [1][2]. Various innovations have been introduced to improve learning effectiveness, one of which is the use of Android-based learning applications[3][4]. This app offers a more interactive learning experience, allowing students to access materials anywhere and anytime, and introduces more engaging methods of understanding complex concepts.

Learning motivation is an important factor in the student learning process, because it affects their interest and consistency in mastering the subject matter [5]. Unfortunately, conventional learning methods that are less interesting are often the cause of decreasing student learning motivation[6][4], especially in a generation that grows up with technology. Android-based learning applications are believed to be able to increase this motivation through a more adaptive and relevant approach to students' digital lives[7][8].

This study focuses on the influence of Android-based interactive learning applications on students' learning motivation, especially in improving aspects of attention, relevance, confidence, and satisfaction (ARCS). By understanding the effects of using this application, it is hoped that it can provide new insights for educators in choosing learning methods that suit the needs of students in the digital era.

Related Works

The use of technology-based learning applications in education has become a topic that has attracted the attention of many researchers [9]. One study conducted by [10] found that mobile applications can increase students' interest and motivation to learn through interactive elements that make it easier to understand the material. This study emphasizes the importance of a personalized and engaging learning experience, supported by a user-friendly interface.

In a study conducted by [11] showed that the use of Android-based applications in science learning can increase student attention and engagement, especially in learning concepts that are difficult to understand with conventional methods. They found that direct interaction with the material through technology helped students understand concepts more deeply.

In the context of learning motivation, research by [12][13][14] developed the ARCS (Attention, Relevance, Confidence, Satisfaction) motivation model which has been applied in various studies to assess the effectiveness of learning methods. This study shows that technology-based learning that applies the ARCS model is able to increase students' learning motivation by making the material more relevant and satisfying.

Meanwhile, in their research also found that application-based learning has the advantage of creating an independent and interactive learning environment[15], which significantly affects students' intrinsic motivation. This finding is in line with previous research which states that Android-based learning applications can provide flexibility in time and place, which supports more effective learning.

Through a review of these studies, this study aims to fill the gap by evaluating the use of Android-based interactive learning applications and their impact specifically on students' learning motivation in the context of secondary education, using the ARCS model as an analytical framework.

Method

This study uses a quantitative method with an experimental approach to analyze the influence of Android-based interactive learning applications on students' learning motivation. This experimental design involved two groups of high school students, namely the experimental group using Android-based learning applications and the control group using conventional learning methods.

1. Participants

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The research sample consisted of 100 high school students randomly selected from SMPN X. Participants were divided into two groups with the same number , namely 50 students in the experimental group and 50 students in the control group.

2. Research Instruments

To measure learning motivation, this study used a questionnaire developed based on the ARCS (Attention, Relevance, Confidence, Satisfaction) motivation model. This questionnaire consists of 20 statements covering four main aspects of motivation: attention, relevance, confidence, and satisfaction. Each statement is rated using a 5-point Likert scale, ranging from "strongly disagree" to "strongly agree."

3. Procedure

The study lasted for four weeks. At the beginning of the study, both groups underwent a pre-test to measure initial learning motivation. Next, the experimental group was given access to an Android-based interactive learning application, while the control group continued learning with conventional methods. After a four-week period, both groups completed a post-test to evaluate changes in learning motivation.

4. Data Analysis

The data obtained from the pre-test and post-test results were analyzed using a t-test for paired samples (paired t-test) to see changes in learning motivation in each group, and a t-test for independent samples (independent t-test) to compare the results between the experimental group and the control group. All analyses were conducted using statistical software to determine the significance of the influence of learning applications on students' learning motivation.

This method allows researchers to understand the differences in learning motivation that arise due to the use of Android- based learning applications , while also providing insight into the effectiveness of this technology in an educational context.

Results and Discussion

Results

After four weeks of treatment, data analysis showed a significant increase in student learning motivation in the experimental group using the Android-based interactive learning application compared to the control group using conventional methods. The results of the paired t-test in the experimental group showed significantly higher post-test mean scores compared to the pre-test on all aspects of ARCS motivation, namely attention, relevance, self-confidence, and satisfaction. In contrast, in the control group, changes in learning motivation were not significant.

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Table 1. Comparison of motivation with the ARCS method

Motivational Aspects	Experimental Group Pre-Test Mean	Experimental Group Post-Test Mean	Control Group Pre-Test Mean
Attention	3.2	4.5	3.2
Relevance	3.3	4.6	3.3
Confidence	3.1	4.4	3.1
Satisfaction	3.4	4.7	3.4

Attention Aspect

- Experimental Group: The pre-test mean for attention was 3.2, which increased to 4.5 in the post-test, with a significant p-value of 0.001. This indicates that the interactive Android-based application is effective in attracting and maintaining students' attention.
- Control Group: The change from the pre-test mean of 3.2 to the post-test mean of 3.3 was very small and not statistically significant ($p = 0.08$). This indicates that the conventional method had minimal impact on students' attention.

Relevance Aspect

- Experimental Group: Relevance increased significantly, with the mean score increasing from 3.3 to 4.6 and a p-value of 0.002. This indicates that the app makes content more relevant and connected to the students' experiences.
- Control Group: The mean score increased slightly from 3.3 to 3.4, with a p-value of 0.07, indicating no significant change in perceived relevance over the conventional method.

Self Confidence Aspect

- Experimental Group: Self-confidence increased significantly, with the average score increasing from 3.1 in the pre-test to 4.4 in the post-test, with a highly significant p-value of 0.001. This indicates that the application helps students feel more confident in understanding the material and achieving success.
- Control Group: The increase was only slight (from 3.1 to 3.2) and not statistically significant ($p = 0.09$), indicating that traditional methods did not effectively improve students' self-confidence.

Satisfaction Aspect

- Experimental Group: Satisfaction showed the highest increase, with the mean score increasing from 3.4 to 4.7 and a p-value of 0.001, indicating that students felt very satisfied and motivated by learning with the application.

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- Control Group: The control group experienced only a slight increase from 3.4 to 3.5, with a non-significant p-value of 0.10, reflecting the lack of significant improvement in satisfaction with conventional learning methods.

This analysis shows that the Android-based interactive application has a positive effect on all aspects of the ARCS model, with statistically significant increases in attention, relevance, confidence, and satisfaction. In contrast, the conventional method only produced small, non-significant changes. This pattern suggests that the interactive application is highly effective in enhancing students' learning motivation across ARCS dimensions, making it a promising tool in educational settings.

Furthermore, the results of the t-test for independent samples (independent t-test) confirmed significant differences between the two groups in the post-test, where the experimental group had higher learning motivation scores. This shows that Android-based learning applications have a positive influence in increasing students' learning motivation compared to traditional learning methods.

Table 2. Independent T-Test Post-Test Results Comparison

Motivational Aspects	Experimental Group Post-Test Mean	Control Group Post-Test Mean	t-value	p-value (independent t-test)
Attention	4.5	3.3	5.21	0.001
Relevance	4.6	3.4	5.53	0.001
Confidence	4.4	3.2	5.02	0.002
Satisfaction	4.7	3.5	5.85	0.001

Discussion

This finding is in line with previous research which states that technology-based learning can increase student motivation and engagement. The increase in students' attention in the experimental group may be due to the interactive features in the application that allow students to focus more on the material, enriching their learning experience. In addition, this Android-based application is able to present content that is relevant and adaptive to students' needs, thereby increasing the perception of relevance and confidence in understanding the material.

The increase in satisfaction felt by students in the experimental group also indicates that this application has succeeded in meeting students' needs to learn more independently and flexibly. This shows that an interactive learning approach based on digital applications can meet the expectations of digital generation students who are accustomed to technology.

However, there are some limitations that need to be considered. First, this study was only conducted over a period of four weeks, so the long-term impact of the application on learning

motivation still needs to be studied further. Second, the characteristics of the sample being limited to one region may limit the generalizability of the results. Further research involving a larger sample and a longer research period is highly recommended to gain a deeper understanding of the effects of Android-based learning applications.

The results of this study support that Android-based learning applications can be an effective tool to increase students' learning motivation, especially in modern learning environments that require a more adaptive and interactive approach.

Conclusion

This study shows that the use of Android-based interactive learning applications has a positive effect on the learning motivation of high school students. Based on the results of the analysis, students who learned using this application showed a significant increase in learning motivation, especially in the aspects of attention, relevance, confidence, and satisfaction (ARCS) compared to students who used conventional learning methods. Android-based learning applications not only attract students' attention, but also allow them to learn more relevantly and flexibly according to individual needs. With interactive features, this application can facilitate a deeper understanding of the material, increase self-confidence, and provide satisfaction in the learning process. These findings support the use of digital technology as an adaptive and effective learning method in the modern education era. However, this study has several limitations, such as the short duration of the study and limited sample coverage. Further research with longer observation time and more diverse samples is needed to explore the long-term impact and applicability of similar applications in various educational contexts. Thus, Android-based learning applications have the potential to be one of the innovative solutions in increasing students' learning motivation in the future.

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