

The Impact of Mobile Learning Utilization on Students' Critical Thinking Skills in the Regional Geography Course

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Abstract The effect of mobile learning on improving students' analytical thinking in the Indonesian Regional Geography course at the Department of Social Studies Education, UIN Maulana Malik Ibrahim Malang. The research uses a quasi-experimental method with a quantitative approach. The subjects of the study consisted of 60 students, divided into two groups: a control group and an experimental group. The instruments used were pretests and posttests, each consisting of 18 multiple-choice questions based on critical thinking indicators. Validity and reliability tests showed that the instruments were reliable. The data were analyzed using normality tests, homogeneity tests, and paired sample t-tests with a significance level of 5%. The results of the study indicate that the use of mobile learning has a significant positive impact on enhancing students' critical thinking skills, with a significance value less than 0.05. These findings are consistent with previous research, which shows that mobile-based learning technologies are effective in improving students' critical thinking skills and learning outcomes. Therefore, the development of mobile learning is expected to improve the quality of Regional Geography education and address the limitations of current learning media.

Keywords Instructional Media; Mobile Learning; Regional Geography; Critical Thinking

A. INTRODUCTION

The rapid advancement of communication and information technology (ICT) has significantly impacted various aspects of life, including education. Global demands drive academic environments to continually adapt to technological developments to enhance and improve educational quality, particularly in integrating technology into learning processes (Baikuna et al., 2024). As digital technology evolves, teaching methods and models have transformed substantially, affecting not only how students learn and teachers instruct but also how educational institutions fulfill their roles and achieve their objectives (Asmarika et al., 2022; Aspi & Syahrani, 2022; Azizah & Apdila, 2020). Traditionally, learning occurred in classrooms with face-to-face interactions between teachers and students, relying on books as primary resources. However, technological advancements have enabled students and educators to access learning platforms anytime and anywhere (Sundari, 2024), allowing students to tailor their learning to individual styles and needs without being constrained by time or location (Azis, 2019; Tinambunan & Siahaan, 2021).

This transformation presents new challenges in the field of education. While digital technology has offered numerous conveniences in learning, Social Studies education, particularly in Regional Geography, still faces several limitations in supporting media for the course. The geography lecture process in higher education has yet to fully engage students actively (Herianto & Ibrahim, 2017; Safriani et al., 2024). These limitations potentially hinder the effectiveness of the learning process and impact students' understanding of Regional Geography. The success of learning can be achieved through the appropriate use of instructional media, which serves as a tool to assist

educators in enhancing the quality of learning and motivating students (Fauriza et al., 2024). To assess students' knowledge of the Regional Geography course, researchers conducted a pretest among 2022 Social Studies Education students at UIN Maulana Malik Ibrahim Malang. The pretest results revealed an average score of 4.5, indicating that students' comprehension remains far from adequate and does not meet the expected standards.

To address these challenges, researchers have developed a mobile learning platform specifically designed to support Regional Geography education, particularly focusing on Indonesia's geographic context. Mobile learning is an innovative approach introduced by researchers to enhance the learning process in this digital era. It serves as an alternative for students to cultivate more flexible and independent learning skills (Sarfita & Sakti, 2024). The accessibility of mobile learning not only enables students to study beyond the classroom but also allows them to adjust their learning schedules according to their individual needs. By leveraging mobile learning technology, this initiative aims to improve the quality and effectiveness of the learning process while assisting students in honing their critical thinking skills (Kholik et al., 2022; Pangalo, 2020; Sadiyyah et al., 2019).

Research aims to determine the significance of utilizing mobile learning on students' analytical thinking. Students will undergo a pretest before using the media and a posttest afterward to measure any improvements or changes in their critical thinking abilities after engaging with the materials provided in the media (Kartini et al., 2021). The researchers also compare the pretest and posttest results to evaluate how effective mobile learning is in enhancing students' understanding and critical thinking skills in the Regional Geography course. Based on the background and challenges addressed, this study is expected to contribute to the development of more effective teaching methods tailored to students' needs while addressing the current limitations in the supporting media for the Regional Geography course.

B. METHOD

This study adopts a quantitative approach and uses a quasi-experimental research design (Sugiyono, 2019). The subjects of the study consist of 60 fourth-semester students enrolled in classes A and B. The instruments used in this research consist of a series of questions to collect data. The questions provided were multiple-choice, including pretest and posttest with 18 questions each, designed based on the indicators of the critical thinking ability variable, which include: 1) Identifying a problem, 2) Gathering information, 3) Problem-solving, 4) Drawing conclusions, 5) Expressing opinions, and 6) Evaluating arguments (Ngurahrai & Farmaryanti, 2019).

The research instruments were tested for validity and reliability using SPSS IBM 23. An item is considered valid if the calculated *r* value is greater than the *r* table value, with the *r* table value for the 18 pretest and posttest questions being 0.349. The results showed that all items were valid, as the calculated *r* values exceeded this threshold. Reliability testing was then conducted, and the data were considered reliable if the Cronbach's Alpha value was above 0.70. The pretest instrument yielded a value of 0.772, while the posttest instrument achieved a value of 0.882, indicating that both instruments are reliable and suitable for use in the research.

Data analysis in this study includes Normality Test, Homogeneity Test, and Paired Sample *t*-Test with a significance level of 5%. The Paired Sample *t*-Test is applied to compare two samples involving the same subjects who receive different treatments. The hypotheses proposed in this study are:

H₀: The implementation of mobile learning does not have an impact on students' ability to think critically in the Regional Geography course.

H_a: The implementation of mobile learning has an impact on students' ability to think critically in the Regional Geography course.

C. RESULT & DISCUSSION

The study on the use of mobile learning in the Regional Geography course analyzes the results of pretest and posttest administered to students in both the control and experimental groups. Before

the learning process began, both groups of students took a pretest consisting of 18 multiple-choice questions. After the learning process was completed, they took a posttest with the same number of questions. The findings from the pretest and posttest reveal a difference in scores between the two groups. This can be observed from the average pretest and posttest scores in both the control and experimental classes. In the control class, the pretest score was 37, while in the experimental class, it was also 37. However, in the posttest, the control class scored 46, while the experimental class achieved a score of 79.

To test the hypothesis proposed in this study, an analysis was performed on the variables being studied using the paired sample t-test method. Before conducting the analysis, the data collected underwent prerequisite tests, namely the normality test and homogeneity test. The normality test aims to determine whether the data are normally distributed. The results of the normality test using the Shapiro-Wilk method showed that the significance values for both the pretest and posttest in the control and experimental classes were above 0.05, indicating that the data have a normal distribution. Following that, a homogeneity test was conducted to assess whether two or more sample groups come from populations with the same variance. The results of the homogeneity test showed a significance value of 0.292, which is greater than 0.05. This indicates that the data have similar variances and can be considered homogeneous.

The next step in data analysis is conducting hypothesis testing using the paired sample t-test. This test is applied to compare the means of two related groups—pretest and posttest scores within the same group—to determine whether there is a statistically significant difference between them. The paired sample t-test helps assess the impact of an intervention (in this case, mobile learning) by comparing the performance of students before and after the treatment. By analyzing the differences in means, the test provides insight into whether the mobile learning platform effectively enhanced students' critical thinking abilities in the Regional Geography course.

Table 1 Paired Sample Test

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre-Test Kontrol - Post-Test Kontrol	-9,000	7,330	1,338	-11,737	-6,263	-6,725	29	,000
Pair 2	Pre-Test Eksperimen - Post-Test Eksperimen	-41,667	13,852	2,529	-46,839	-36,494	-16,475	29	,000

The results of the analysis using the Paired Sample Test show a significance value of 0.000, which is smaller than 0.05. Therefore, the null hypothesis (H_0) is rejected, indicating a significant effect between the conditions before and after the learning process in both the control and experimental groups. These findings suggest that the use of Mobile Learning has a positive impact on improving the critical thinking skills of students in the Education Department of Social Sciences at UIN Malang, particularly in the Regional Geography course. This conclusion is based on the noticeable improvement in the results between the pretest and posttest administered to students before and after the learning process.

This study aligns with the findings of Indriani et al. (2023) in their meta-analysis *"The Impact of E-learning Media on Critical and Creative Thinking Skills."* The research shows that the use of e-learning as a learning medium significantly enhances students' intellectual abilities and critical thinking skills. E-learning successfully improved intellectual abilities by 91.30% and critical thinking skills by 94.40%, with a significance value of 0.00 for the intellectual ability variable. These findings reinforce the positive influence of e-learning usage on the improvement of students' critical thinking skills.

Additionally, a similar study conducted by Safitri et al. (2023) *"The Impact of Lectora Inspire Usage on Critical Thinking Skills of Students at SMAN 49 Jakarta in Geography Subject"* shows a significant difference in the posttest results between students in the experimental class who used the

Lectora Inspire learning media and those in the control class who did not. The average posttest scores in the experimental class were higher, indicating that the use of Lectora Inspire had a positive effect on enhancing students' critical thinking skills. This improvement was particularly noticeable in the critical thinking indicator, where the ability to draw inferences increased by 38.64%. Students also gave positive responses to the use of Lectora Inspire, with agreement rates ranging from 60% to 96%. However, this media was not fully effective in improving all aspects of critical thinking, such as basic support skills, which only showed a 18.99% increase. These findings strengthen the argument that the use of technology-based learning media, such as Lectora Inspire and Mobile Learning, can enhance critical thinking skills. However, the effectiveness may vary depending on the specific aspects of critical thinking being measured and the characteristics of the material being taught.

The study by Indrawati & Amin (2023) "*Development of Hydrosphere Mobile Learning (HML) to Enhance Interest and Learning Outcomes in Geography*" shows that the developed HML application is effective in improving student interest and learning outcomes on the topic of the hydrosphere at MA Al Hidayah Wajak, with validation from subject matter and media experts reaching 96%. The positive impact of this application is reflected in the significance value of Sig. (2-tailed) of 0.000, which is smaller than 0.05, indicating a significant improvement in students' interest and learning outcomes in geography.

These findings indicate that the use of mobile learning can enhance various aspects of learning and improve students' critical thinking skills. Therefore, it is important to continuously develop the features of mobile learning applications and improve educational facilities to support more effective learning.

D. CONCLUSION

This research seeks to assess the effect of mobile learning enhancing students' analytical thinking in the Regional Geography course. The results show that mobile learning has a significant positive impact on students' critical thinking abilities. Data analysis from the pretest and posttest, along with statistical tests that resulted in significance values below 0.05, indicates that mobile learning significantly enhances critical thinking skills. The pretest and posttest instruments used in this study have been proven to be valid and reliable, making the research findings accurate. These findings align with previous studies, which suggest that mobile-based learning technologies are effective in enhancing critical thinking skills and learning outcomes.

The limitations of this study are crucial aspects to be addressed and further developed in future research. First, this study involved only fourth-semester students from the Social Studies Education program at UIN Malang, which limits the generalizability of the findings to students in other institutions or programs. Second, the study focused solely on the Regional Geography course, leaving the effectiveness of mobile learning in other courses unexplored. Third, the duration of mobile learning implementation was relatively short, making it difficult to measure its long-term impact. Moreover, the mobile learning media utilized in this study might not fully support all aspects of critical thinking, particularly those requiring more in-depth interaction, such as argument evaluation.

Based on the findings and limitations of this study, future researchers are encouraged to develop more interactive features for mobile learning, such as problem-based simulations or virtual discussions, to comprehensively enhance critical thinking skills. Subsequent studies should also involve a broader sample from various educational institutions to strengthen the generalizability of the results. Additionally, evaluating the long-term impact of mobile learning is essential to understand its sustained effects. Future research could also compare the effectiveness of mobile learning with other digital learning media, such as web-based e-learning, to identify the relative advantages of each platform. Integrating mobile learning with collaborative approaches, such as group work or discussions, is also recommended to further enhance learning effectiveness. These steps in future research are expected to contribute more broadly to the development of technology-based learning methods in higher education.

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