The Effect of Using Quizizz as a Quizzing Platform on Motivation and Learning Outcomes of Students in Informatics Subjects

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Abstract: This study aimed to analyze the effect of using Quizizz Paper Mode on students' learning outcomes and motivation in Informatics subjects at SMK Negeri 2 Kepulauan Mentawai. A quasi-experimental design was employed with two grade X classes (16 students each) assigned to experimental and control groups. Data were collected through learning achievement tests, motivation questionnaires, observations, interviews, and documentation, and analyzed using quantitative and qualitative approaches. The results indicated that Quizizz Paper Mode significantly improved both learning outcomes and motivation compared to conventional methods. These findings highlight that gamification through Quizizz Paper Mode provides an adaptive solution for schools in areas with limited ICT infrastructure, such as Mentawai, by creating an engaging and interactive learning environment without relying on internet access or digital devices. The study implies that similar innovations could be implemented more broadly in under-resourced schools to support equitable learning opportunities in the digital era.

Keywords: Informatics; Learning motivation; Learning outcomes; Quizizz paper mode

Introduction

The Fourth Industrial Revolution has brought significant changes to various aspects of life, including education, where digital literacy has become an essential competency for students to compete in the global era. Digital literacy today extends beyond the mastery of technology to include critical thinking, problem-solving, and responsible use of digital resources (Akhmadi et al., 2025). In the Indonesian context, Informatics has been introduced as a strategic subject to foster adaptive and applicable digital literacy from an early stage (Aditiyawarman et al., 2022; Hariyastuti & Triana, 2024; Tarigan et al., 2024).

Despite this, many schools, particularly those in disadvantaged, frontier, and remote (3T) areas, still face serious challenges in implementing technology-based learning. Limited digital infrastructure, unstable internet connectivity, and the scarcity of devices often prevent meaningful integration of ICT into teaching. Consequently, conventional methods remain dominant, which frequently fail to meet the learning styles of digital-native students (Lestari & Rohman, 2022; Pratama, 2021). This situation can result in low motivation and suboptimal learning outcomes, highlighting the urgent need for adaptive learning innovations that are interactive, relevant, and feasible in resource-limited contexts (Husnah et al., 2022; Pratama, 2021; Sihite & Hamzah, 2025).

One promising approach is gamification, which has been widely recognized for its ability to improve student motivation and learning outcomes. Quizizz, a game-based learning platform, integrates features such as leaderboards, points, and instant feedback to create an engaging and competitive classroom atmosphere. Of particular relevance for schools with limited

infrastructure is the Paper Mode feature, which enables teachers to print digital quizzes, distribute them physically, and later scan answer sheets for automatic scoring (Putra & Afrilia, 2020; Safarati & Rahma, 2020). This feature bridges technological innovation with infrastructural constraints, making it possible for schools in low-resource environments to still benefit from interactive and motivating learning experiences (Putri & Sari, 2025; Aulia & Warni, 2024; MY et al., 2024; Ayumi, 2024).

This research focuses on SMK Negeri 2 Kepulauan Mentawai, a vocational school located in a 3T region with considerable technological limitations (Göksün & Gürsoy, 2019). The uniqueness of this study lies in demonstrating that Quizizz Paper Mode provides an adaptive and practical solution to enhance both learning outcomes and motivation in Informatics education without reliance on internet connectivity or personal digital devices (Arifin & Arifin, 2023; Utami & Hidayat, 2022).

Accordingly, the study aims to analyze the effectiveness of Quizizz Paper Mode in improving learning outcomes and learning motivation of students in Informatics subjects at SMK Negeri 2 Kepulauan Mentawai (Zainuddin et al., 2020). The findings are expected to provide practical insights for implementing inclusive, gamification-based learning strategies in schools with similar conditions (Sari & Putra, 2021).

Previous research on gamification has mostly been conducted in well-equipped digital learning environments. Far less attention has been paid to contexts where infrastructure is scarce, even though many schools in Indonesia continue to face systemic barriers to technology integration (Mimouni, 2022). By examining the application of gamification in such a setting, this study contributes new empirical evidence on how adaptive approaches like Paper Mode can support equitable access to engaging learning practices (Prasetyo & Lestari, 2020).

Beyond measuring effectiveness, this study is significant for vocational education. Vocational schools aim to prepare students with both theoretical knowledge and practical competencies (Janković et al., 2023). In this context, innovative and feasible evaluation tools are essential to strengthen competency-based learning (Ruiz et al., 2023). Therefore, the contribution of this research lies not only in validating the use of Quizizz Paper Mode but also in providing a model for how gamification can be adapted to local constraints to motivate students, support learning outcomes, and help bridge the digital divide in education (Rahmawati & Yusuf, 2019).

Method

This study employed a quantitative approach with a quasi-experimental nonequivalent control group design. The subjects were all 32 tenth-grade students of the Computer and Network Engineering (TKJ) program at SMK Negeri 2 Kepulauan Mentawai in the 2024/2025 academic year. They were divided into two intact classes: Class X TKJ A (16 students) as the experimental group and Class X TKJ B (16 students) as the control group. The selection of classes was based on their relatively similar academic characteristics and the practical considerations of the school. Thus, the entire population of the two classes was involved as the research sample (Kurniawan & Suryani, 2024; Marlina & Hakim, 2023).

The experimental group received treatment in the form of learning evaluation using Quizizz Paper Mode, while the control group continued with conventional evaluation methods (Vestlund & Hamari, 2022). Data were collected using both test and non-test techniques (Hsiao & Chen, 2021). The test instruments consisted of pre-tests and post-tests to measure students' learning outcomes. The non-test instruments included a closed-ended learning motivation questionnaire, supported by teacher and student interviews, participatory classroom observations, and documentation of learning activities (Fadilah & Anwar, 2022; Handayani & Prakoso, 2021).

Instrument validity (learning achievement test and motivation questionnaire) was ensured through expert judgment by two specialists in Informatics education for content validity, and by item correlation analysis using SPSS for construct validity (Montenegro-Rueda et al., 2023). Reliability tests were also conducted to confirm consistency of the instruments (Kaur & Whatmore, 2024). The practicality of Quizizz Paper Mode was assessed based on teacher and student responses regarding ease of use, time efficiency in correction through QR code scanning, and its suitability for the school context. These data were obtained through response sheets and short interviews (Aditiyawarman et al., 2022; Salsabila et al., 2020; Supriyanto & Syamsuri, 2025).

Data analysis included normality and homogeneity tests as prerequisites, followed by an independent sample t-test to examine differences in learning outcomes and motivation between the two groups (Plump & LaRosa, 2017). In addition, the N-Gain index was calculated to determine the effectiveness of Quizizz Paper Mode in improving students' learning outcomes and motivation (Balqis & Andriani, 2024; Fiantika & Zuriah, 2023; Pahlevi & Mulyati, 2025).

Results and Discussion

The analysis of learning outcomes showed that both the experimental and control groups had relatively similar initial abilities during the pre-test stage. After the intervention, however, the experimental group using Quizizz Paper Mode achieved a substantially higher post-test average than the control group. The independent sample t-test confirmed that this difference was statistically significant (p < 0.05).

The N-Gain analysis further indicated that the experimental group achieved an average gain of 0.52, categorized as Moderately Effective (40–59%). In contrast, the control group showed only a slight improvement. These findings demonstrate that Quizizz Paper Mode significantly enhanced students' cognitive learning outcomes compared to conventional methods.

The initial motivation levels of both groups were relatively similar, with no significant difference (p > 0.05). After the treatment, the experimental group showed a remarkable increase in motivation, while the control group remained almost unchanged. The independent sample t-test confirmed that the post-treatment difference was highly significant (p < 0.05).

The N-Gain value for the experimental group's motivation was 0.63, which falls into the Effective category (60–79%). This confirms that Quizizz Paper Mode was not only effective in improving academic performance but also played a strong role in fostering students' learning motivation.

Table 1. Summary of results on learning outcomes and motivation

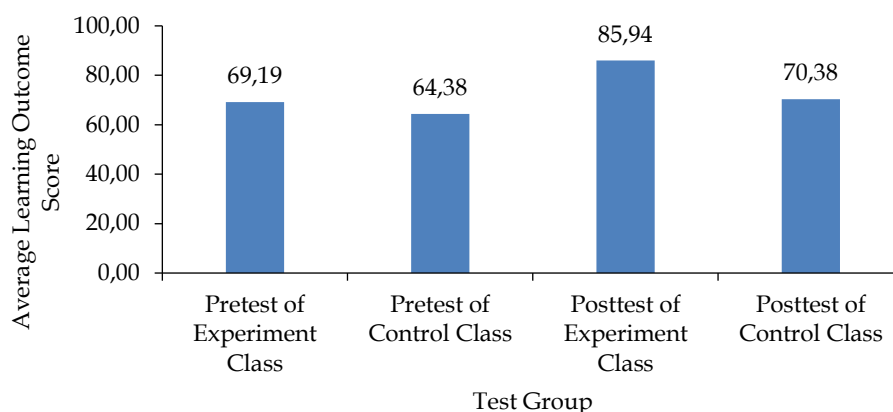| Variable	Experimental Mean (SD)	Control Mean (SD)	t-test (p-value)	N-Gain (Experimental)	Standard Deviation
Learning Outcomes (Pre-test)	69.19 (6.43)	64.38 (6.94)	2.46 (0.020)	-	-
Learning Outcomes (Post-test)	85.94 (6.13)	70.38 (6.19)	5.83 (0.000)	0.52	Moderately Effective (40–59%)
Learning Motivation (Pre-test)	66.00 (4.18)	68.44 (6.00)	-1.41 (0.168)	-	-
Learning Motivation (Post-test)	87.88 (5.65)	68.31 (5.09)	10.37 (0.000)	0.63	Effective (60–79%)

Figure 1. Comparison chart of average pretest and posttest values of experimental and control classes
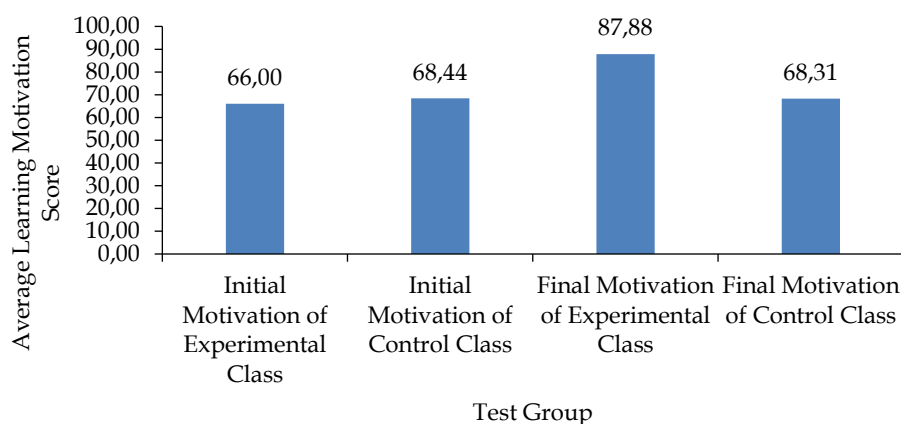

Figure 2. Comparison Chart of Average Pretest and Posttest Values of Experimental and Control Classes

Figure 1 illustrates the comparison of pre-test and post-test scores for learning outcomes. The experimental group shows a steeper increase than the control group, confirming the stronger cognitive improvement due to Quizizz Paper Mode.

Figure 2 presents the comparison of motivation scores before and after the intervention. While the control group shows almost no change, the experimental group demonstrates a significant increase, highlighting the motivational impact of the gamified approach.

Figure 1 and 2 document the classroom implementation of Quizizz Paper Mode, including the distribution of printed quizzes and the scanning process for automated correction. These visuals provide evidence of how the intervention was carried out in practice, reinforcing both its feasibility and contextual relevance.

Besides its effectiveness, the study assessed the validity and practicality of Quizizz Paper Mode. The instruments for measuring learning outcomes and motivation were validated by experts and confirmed through construct testing. Teachers reported that Quizizz Paper Mode was practical, citing ease of preparation, efficiency in QR code-based correction, and suitability for schools with limited ICT infrastructure. Students likewise found the media user-friendly and engaging, particularly because it did not require personal digital devices. These findings highlight the practical advantages of implementing the tool in low-resource contexts.

The effectiveness of Quizizz Paper Mode can be explained through gamification and learning theories. Elements such as leaderboards, points, and instant feedback functioned as reinforcements consistent with behaviorist principles, while simultaneously fulfilling students' psychological needs for competence, autonomy, and relatedness, as explained in Self-Determination Theory. These findings are consistent with previous research that demonstrated the benefits of gamification for learning outcomes and motivation. However, this study provides new evidence by showing that Quizizz Paper Mode is equally effective in schools with limited digital infrastructure, making it a valuable and adaptive solution for inclusive education in disadvantaged regions.

Conclusion

Based on the results of research conducted at SMK Negeri 2 Kepulauan Mentawai, it can be concluded that the use of Quizizz Paper Mode learning media has a very significant effect on improving student learning outcomes and motivation in Informatics. The experimental group achieved much higher post-test scores (85.94) compared to the control group (70.38), and

their final motivation was also significantly greater (87.88 vs. 68.31), indicating that the integration of gamification-based media, even in print format, can substantially enhance engagement and academic achievement compared to conventional teaching methods. This effectiveness is further supported by the N-Gain results, where the experimental group reached an average of 0.520 (52.0%) for learning outcomes, categorized as "Moderately Effective," and 0.636 (63.6%) for motivation, categorized as "Effective," showing that Quizizz Paper Mode not only strengthens conceptual understanding but also fosters enthusiasm, interest, and active participation, even in contexts with limited technology. In addition, this media is valid, practical, and effective: its instruments have been validated by experts to ensure accurate measurement, it is easy for teachers and students to use without internet connectivity or personal devices, and it allows efficient automatic correction via QR code scanning. Altogether, the evidence demonstrates that Quizizz Paper Mode is an innovative and adaptive solution that deserves wider implementation, particularly in schools located in 3T regions facing ICT infrastructure challenges.

Author Contributions
This research article was written by four authors with their respective contributions: Conceptualization, methodology, Y.A. and S.; formal analysis, data curation, writing-preliminary draft, Y.A.; writing-review, literature review, and editing, G. and D.I. All authors have read and approved the published version of the manuscript.

Conflicts of Interest
No conflicts of interest are disclosed by the writers.

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