



The Effect of Using Quizizz Learning Media on Student Learning Outcomes in Local Content Subjects for Class X TKJ at Private Vocational Schools in Jambi, Medan, Academic Year 2025/2026

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ABSTRACT

This study attempts to determine the effect of using interactive learning media Quizizz on student learning achievement in Local Content subjects at SMK Swasta X TKJ Jambi Medan in the 2025/2026 academic year. This study was motivated by the low performance results of students who were below the Minimum Completion Criteria (KKM) and low student participation due to the still dominant conventional learning methods. Quantitative methods were used with a quasi-experimental design for this study. The study population was all 64 students of class X TKJ who were divided into control and experimental groups. Pretest and posttest data collection used multiple choice tools. Data analysis used the Mann-Whitney Test to measure significant differences between groups that used Quizizz media and those that did not use Quizizz media. The results showed that there were differences in student learning outcomes between the control and experimental groups. Thus, the use of Quizizz learning media successfully improved student learning outcomes in Local Content subjects. The use of technology-based interactive learning media is recommended by this study as a method to increase student engagement and learning outcomes.

Learning Outcomes, Learning Media, Local Content, Quizizz, Vocational School

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INTRODUCTION

Amidst the rapid advancements that characterize our contemporary landscape, the role of education has emerged as vital in nurturing a generation ready to engage in various aspects of life. Education serves as a journey that inspires individuals to develop their personal growth. Education is a vital need for all individuals, so its presence must be realized in one's life. By engaging in education, individuals will increase their capacity to overcome various challenges in line with contemporary progress (Rosanaya & Fitrayati, 2021). Education serves as a catalyst for transformation within individuals. Through

education, individuals can gain significant insight and understanding. Education significantly influences the character of a nation, as articulated in Law No. 20 of 2003. This law characterizes education as a deliberate and structured effort aimed at fostering an environment and learning process that enables students to actively develop their potential. This development includes spiritual and religious strength, self-discipline, personality, intelligence, moral integrity, and the essential skills needed for the advancement of individuals, society, the nation, and the state (Alfianti et al., 2020).

Knowledge is developed through a dynamic exchange between learners, instructors, and educational materials within an academic environment. The educational journey aims to foster behavioral transformation in students, catalyzed by their learning experiences. Essentially, the learning process involves the exchange of knowledge between educators and learners (Ap et al., 2022). Educators serve not only as sources of knowledge but also as mentors, facilitators, and sources of inspiration for their students. Therefore, it is crucial to create educational resources that enhance student engagement and foster their enthusiasm and achievement in mathematics. The selection of educational resources is crucial to fostering the development of students' cognitive abilities, including logical, critical, and creative thinking (Amsul et al., 2022).

Learning outcomes refer to the competencies that students develop as a result of their educational experiences (Nugraha et al., 2020). Better educational outcomes can be achieved through deliberate and strategic initiatives, fostering constructive transformation, and characterized as a learning process. After the educational journey concludes, student learning outcomes are realized. Learning outcomes achieved in the classroom are the collective accumulation of individual student accomplishments. These comprehensive findings illustrate the interplay between educational engagement and teaching methodology.

According to Purwanto (Nuralan, 2022), learning outcomes are the achievement of educational goals by students involved in the teaching and learning process. Learning outcomes can be viewed as transformations resulting from changes in human attitudes and behavior. Hamdan and Khader (Hamna & Windar, 2022) emphasize that learning outcomes serve as a basis for evaluating and communicating students' academic success, playing a crucial role in developing a more effective educational framework that aligns student learning with assessment methods. The culmination of the educational journey is reflected in the assessment of learning outcomes, which reveals the knowledge and skills that students have acquired and honed.

Learning outcomes can be categorized into three main domains: cognitive, affective, and psychomotor skills. In the cognitive domain, Anderson &

Krothwal (Dalam Nurtanto & Sofyan, 2015) categorizes abilities into remembering, understanding, applying, analyzing, evaluating, and creating.

Initial observations at a private vocational school in Jambi, Medan, showed that student learning outcomes in local content subjects were still far from the expected criteria in all three domains. The learning process was characterized by a teacher-centered approach, where the educator remained the focal point of learning, neglecting the use of interactive learning media. This condition contradicts the concept of ideal learning according to Bloom's theory, where students should be able to develop cognitive abilities from the basic level to the creative level, affective abilities in responding to and internalizing learning values, and psychomotor abilities in applying learned skills.

From the description above, it can be concluded that learning outcomes serve as a benchmark for achieving educational goals, reflecting the transformation of students' attitudes and behaviors after they engage in learning activities. Learning outcomes serve not only as indicators of academic success but also as a crucial basis for developing a more impactful educational framework. However, conditions at Jambi Medan Private Vocational Schools indicate a gap between expected learning outcomes and the reality on the ground, particularly in local content subjects. This opinion is also supported by the following data.

The results of preliminary research conducted by the author in mid-November 2024 at the Jambi Medan Private Vocational School showed that the Minimum Completion Criteria (KKM) value set for local content subjects for class X was 75.

The unsatisfactory learning outcomes of students in local content subjects at private vocational schools in Jambi, Medan, can be caused by various factors, particularly the learning approaches used by educators. Educators have not fully implemented interactive learning media; interactions are often one-way, with a single instructor at the center of the educational experience. This results in a lack of student engagement in learning activities. The dominant authority of educators within the educational framework has created a learning environment that is less dynamic and interactive, so that students often become passive recipients of information rather than active participants in developing their own understanding.

The educational environment significantly influences students' understanding and mastery of the subject matter, ultimately leading to suboptimal learning outcomes. At a private vocational education institution in Jambi, Medan, the Local Content curriculum for grade X TKJ is carefully structured to emphasize the hygienic processing of Indonesian food products,

including animal and plant-based ingredients. This educational program is held over two semesters, with a total of 72 hours of lessons (36 hours per semester), carefully structured to reflect the complexity and comprehensive scope of the material expected to be understood by students. This topic has its own uniqueness that distinguishes it from other topics, namely contextual, emphasizing local wisdom inherent in Indonesian culinary arts, and integrative by combining theoretical and practical dimensions. This product promotion material covers 8 hours of lessons, where students must understand marketing concepts, promotional strategies, and target consumer analysis to implement them effectively. This study aims to equip students with learning materials that focus on the concept of promotion and promotional strategies for food products. This approach is designed to improve their theoretical understanding before being evaluated using Quizizz media. The integration of contemporary learning technology is crucial to advancing educational methodology. Quizizz is an example of an innovative approach to education through the integration of contemporary learning technologies. This web-based educational tool is designed as a quiz game, effectively engaging students' interest in the subject matter (Yolanda & Meilana, 2021).

This study used Quizizz as a data collection tool. Quizizz serves as an innovative educational tool that enhances the learning experience, transforming it into a more engaging and dynamic process. The platform promotes a dynamic learning approach, encouraging student engagement through competitive interactions with peers. Furthermore, Quizizz's online quiz framework facilitates competition and collaboration among students, potentially impacting their social and emotional development. Thus, using Quizizz goes beyond enhancing comprehension; it fosters a more engaging and enjoyable educational journey (Supriadi et al., 2021).

The role of learning media is crucial in enabling educators to present learning content effectively, develop students' imaginative thinking skills, and capture their interest. Accessibility to easy-to-use and easy-to-understand educational resources is a crucial requirement for educators in the contemporary era. This shifts the role of educators from simply imparting knowledge to utilizing technology to facilitate learning (Azzahra & Pramudiani, 2022).

Research conducted by (Utama et al., 2024) at SMK 4 Bengkulu City showed a significant increase in student learning outcomes after using Quizizz as a learning medium. This study demonstrated the effectiveness of Quizizz in improving the learning achievement of class X PPLG students, demonstrating a positive response from students to the use of Quizizz as a learning medium.

Students demonstrated higher enthusiasm for learning, a deeper understanding of the subject matter, and a more engaging and dynamic learning environment.

As noted by (Astika et al., 2023), Quizizz has the potential to increase student enthusiasm for learning, which in turn leads to better learning outcomes. However, there are still areas of research that require further investigation. Currently, there is a lack of targeted research examining the impact of Quizizz on student learning outcomes in local content subjects for 10th-grade TKJ (Technology and Communication Technology) at private vocational schools in Jambi, Medan.

This study attempts to address the existing knowledge gap by conducting an in-depth analysis of how Quizizz as a learning medium influences the academic achievement of grade X TKJ 1 students in the Local Content subject at a private vocational high school in Jambi, Medan. This study aims to increase our understanding of the effective application of technology in enriching the learning experience at the vocational high school level.

Therefore, the findings of this study are expected to provide valuable insights for educators, school leaders, and decision-makers in an effort to improve educational standards in private vocational schools in Jambi, Medan, and the surrounding areas. This explains why the author chose the title "The Effect of Using Quizizz Learning Media on Student Learning Outcomes in Local Content Subjects for Class X TKJ in Private Schools in Jambi, Medan, Academic Year 2024/2025".

RESEARCH METHOD

The research was conducted at SMKS Jambi Medan, located at Jalan Pertiwi No. 116, Bantan, Medan Tembung District, Medan City, North Sumatra. This research was conducted in the final semester of the 2025/2026 academic year. This study used a quantitative research methodology with a quasi-experimental design. This study aims to collect reliable information through a carefully organized research framework. This approach involves collecting information from specific populations and samples, followed by data analysis through hypothesis testing.

The subjects of this study were all students of class X TKJ of SMK Swasta Jambi Medan consisting of 2 classes with a total of 64 students. This study used the Total Sampling technique derived from the entire population. Total sampling as a technique that involves selecting samples from all members of the population. This shows that the entire population is considered as a sample, especially in class X TKJ Local Content subjects at a private vocational school located in Jambi, Medan.

The research design outlines the steps required in accordance with the research objectives to ensure valid data collection. The research used is characterized by a quantitative methodology with a quasi-experimental design. The aim is to test the impact of using Quizizz as a learning aid on the academic achievement of tenth-grade TKJ students in the Local Content course at a private vocational institution in Jambi, Medan. The aim is to ascertain differences by evaluating the control group against the experimental group after treatment. The research design used is a quasi-experimental approach featuring a non-equivalent control group design. This quasi-experimental approach involves at least two sample groups: the experimental class and the control class. The aim is to assess the impact, and subjects are not randomly selected.

This study involved a control group that was not fully effective in managing and managing variables that could potentially influence the experimental group's outcomes. Generally, selected class groups underwent pre- and post-intervention assessments. Before the intervention, both classes underwent a pre-test with an equivalent difficulty level to assess the groups' initial status before the treatment began. Furthermore, the experimental group used the Quizizz learning platform, while the control group did not receive this intervention. Subsequently, both classes underwent a final assessment (post-test) to evaluate their status after the intervention.

This study used a combination of observation techniques and testing methodology. Assessments were used to evaluate students' understanding of the subject matter, both before and after the integration of Quizizz as a learning tool, using pretests and posttests. The data analysis aimed to gather evidence regarding the impact of Quizizz as a learning medium on student performance, leading to the formulation of hypotheses based on the findings obtained from the analysis. In line with the aforementioned research objectives, the t-test method (independent sample t-test) was used. This assessment seeks to evaluate the differences in the means of two different groups, aiming to determine whether their means are aligned or different.

RESULT AND DISCUSSION

Results

After analyzing the results of the prerequisite test, hypothesis testing was carried out using the Mann-Whitney U Test to evaluate the learning outcomes of the experimental group that utilized Quizizz media compared to the control group that used conventional learning methods.

Table 1.
Results of the Mann-Whitney U Test for Meeting 2

Test Statistics^a

	Hasil
Mann-Whitney U	294.500
Wilcoxon W	790.500
Z	-2.317
Asymp. Sig. (2-tailed)	.021

a. Grouping Variable: Kelas

The findings of the Mann-Whitney U Test conducted at Meeting 2 showed an Asymp. Sig. (2-tailed) of 0.021 smaller than 0.05, so H_0 was rejected and H_1 was accepted. This indicates a significant difference in learning outcomes between students who used Quizizz as a learning medium and students who used traditional methods related to Promotion Strategy material.

The findings from the hypothesis testing conducted through the Mann-Whitney U Test at both meetings lead us to the following conclusions:

1. The influence of Quizizz as a learning medium on the learning outcomes of students in the Local Content subject of class X TKJ at Jambi Medan Private Vocational School is quite good, as seen in the first and second meetings.
2. The effectiveness of the Quizizz media was higher in Meeting 1 with a significance value of 0.000 compared to Meeting 2 with a significance value of 0.021. This indicates that the Quizizz media is very effective for learning basic concepts and remains effective for more complex material.
3. The difference in Z-score values indicates different strengths of effect: Meeting 1 ($Z = -3.502$) has a stronger effect than Meeting 2 ($Z = -2.317$), but both show a significant effect.

This finding is consistent with previous research by Utama et al. (2024) and Saputra et al. (2023), which demonstrated the effectiveness of Quizizz as a learning medium in improving student achievement. The efficacy of Quizizz can be explained through Richard E. Mayer's Cognitive Multimedia Learning Theory, which states that learning is enhanced when visual and auditory channels are used simultaneously, as is the case with the interactive Quizizz platform.

Thus, the research hypothesis which states that "The use of Quizizz learning media has a positive effect on the learning outcomes of students in the

Local Content subject of class X TKJ at Jambi Medan Private Vocational Schools" can be accepted and tested statistically.

Discussion

Cognitive Theory of Multimedia Learning (Richard E. Mayer)

A cognitive theory of multimedia learning was proposed by Richard E. Mayer. The theory (Mayer, 2014) states that the human brain interacts with information through two distinct channels: visual and auditory. Learning effectiveness is significantly increased when both modalities are used simultaneously. These channels' function when educators deliver visual information, including text, images, and graphics, alongside verbal communication relevant to the subject matter. In this scenario, learners can choose vocabulary or visuals to enhance their comprehension and retention. Once the material is thoroughly internalized, the newly acquired knowledge is integrated into long-term memory.

In addition to these fundamental premises, there are additional considerations regarding multimedia learning that serve as cautionary notes for educators: 1). Limited potential. When information overload occurs, it can severely overwhelm students' cognitive capacities. Mayer articulated three distinct theories related to cognitive load. First, there is intrinsic cognitive load, which relates to the demands placed on students by the content itself. Next, we consider germane cognitive load, which reflects the mental effort required of students to assimilate new information with their existing knowledge. Finally, extrinsic cognitive load refers to unnecessary mental stress caused by factors inconsistent with the desired learning objectives. Consequently, educators could introduce media that can be understood in a nuanced manner; 2). Engaged analysis. Optimal learning occurs when students are actively engaged in the learning process. Furthermore, educators should have presentation materials that facilitate student understanding.

The conclusions drawn from this theory indicate that the application of multimedia in educational practice promotes effective learning by reducing mental stress, minimizing cognitive load, and increasing alignment with learning objectives. Therefore, educators can use various learning media to facilitate a harmonious exchange of information with their students. This study aims to explain the educational resources used to improve student retention rates.

Instructional Media

Educational media serves as a vital channel, facilitating a deeper understanding of learning materials for educators and students in an effective and efficient manner. The shared perspectives demonstrate that media serves as

a vehicle for disseminating information within an educational framework (Musfiqon, 2012). Learning media includes all tools or resources that facilitate the delivery of messages, engage the minds, emotions, and focus of learners, thereby enhancing their educational journey (Aqib, 2010). Learning media encompasses a variety of tools educators use to engage the five senses (sight, hearing, touch, smell, and taste) during instruction. The incorporation of instructional media into an educational framework can spark new interests and aspirations, while increasing student motivation throughout the learning experience, as noted by Hamalik (dalam Rizki Wahyuningtyas, 2020). From the insights provided by these specialists, one can conclude that learning media refers to resources that facilitate the educational process, increase the clarity of the message conveyed and ensure that educational goals are achieved in an effective and efficient manner.

As information and communication technology continues to advance, it is crucial for educators to stay abreast of these developments in order to effectively present learning materials. Educators must be able to use engaging and engaging learning resources that align with the diverse educational needs of their students. This will facilitate students' understanding of the material presented by instructors. Nasution outlined several advantages of utilizing learning media as an instrument in the educational process, including: a. Learning becomes more engaging for students, thus increasing their drive to acquire knowledge. b. Educational resources will convey more precise meanings, facilitate deeper understanding among students, and empower them to effectively achieve learning objectives. c. Diverse learning approaches, going beyond mere verbal exchanges through instructor dialogue, ensure that students remain engaged and educators maintain their enthusiasm. d. Students participate in a variety of learning experiences, as they not only absorb information from instructors but also engage in activities such as observing, practicing, and demonstrating (Nurrita, 2018).

Meanwhile, Azhar Arsyad presents the following conclusions regarding the use of learning media in the educational process: a. The use of learning media can improve the clarity of message presentation and information dissemination, thereby facilitating and enriching the educational experience and its outcomes. b. The use of educational media has the potential to increase and focus children's attention, foster learning motivation, and facilitate more direct engagement between students and their environment. c. Educational media has the capacity to transcend the limitations of sensory perception, spatial boundaries, and temporal limitations. Objects that exceed the spatial boundaries of the classroom can be effectively replaced by images, slides, or

films. Although small objects can be effectively displayed using microscopes, films, slides, and images. Similarly, unique events from history can be displayed through various media such as video recordings, films, photographs, and slides. d. The use of media in education can provide students with comparable experiences regarding events that occur in their environment (Nurrita, 2018).

From the previous discussion, learning media has many benefits, including:

- a. The advantages of media education for educators include providing a framework that enables teachers to achieve learning objectives, articulate educational content in a structured manner, and assist in the delivery of engaging material that improves the overall quality of learning.
- b. The benefits of media in education for students are worth noting: increasing their motivation and involvement in the learning process, enabling them to think critically and analyze the material presented by the instructor in a conducive and enjoyable environment, thus facilitating a clearer understanding of the subject matter.

Media Quizizz

The integration of internet technology is crucial in contemporary society, especially in education. The emergence of online educational platforms and applications has the potential to address challenges affecting the overall quality of education. An interesting example of online educational technology is Quizizz. Quizizz Media serves as a platform for developing engaging, quiz-oriented educational resources. Instructors combine various elements such as words, phrases, images, audio files, and videos to enhance students' understanding and retention of the course material. Quizizz is known as an accessible and engaging platform that facilitates both online and offline educational experiences. Quizizz is known as an accessible and engaging platform that facilitates learning in both digital and traditional environments. As noted by (Purba, 2019), Quizizz functions as a game-based platform that encourages a variety of engaging activities, offering students the opportunity to participate in interactive and fun classroom practices. The Quizizz app encourages a competitive environment for students by implementing a ranking system. This fosters enthusiasm and motivation among students, allowing them to engage in the game while acquiring knowledge smoothly. (Solikah, 2020) Quizizz is a digital platform for quizzes that can be gamified and utilized as an educational tool.

Quizizz offers insights into student understanding, allowing educators to monitor responses and identify challenging questions for learners. Quizizz

allows for self-creation of quizzes and offers millions of quizzes covering a wide range of subjects, all created by fellow users. Meanwhile, Quizizz emphasizes a student-centered pedagogical approach, fostering a more engaging and dynamic learning experience. Therefore, Quizizz serves as a valuable tool in economics education, creating an interactive and fun environment that enhances students' cognitive growth through the integration of play and learning.

The educational experiences created within Quizizz offer a variety of engaging attributes, such as:

- a. Student pace. Questions will appear on students' devices or technology. This allows students to interact with questions at a pace that suits their individual development. When students respond quickly, the next question will also be asked immediately.
- b. BYOD (Bring Your Own Device). Students are allowed to use their own personal devices. Quizizz is available on any device via a web browser, including PCs, laptops, smartphones, and more.
- c. A variety of public quizzes. This function allows educators to utilize or use assessments created by their colleagues.

In short, Quizizz serves as a digital platform designed for developing online quizzes. It offers assessments tailored to the student's pace and accuracy, while maintaining an engaging atmosphere. Quizizz serves as a valuable tool in education, offering students ample opportunities to interact with the material at their own pace, ultimately improving their academic performance. Quizizz's primary goal is to improve student retention. It also allows educators to gauge class progress by measuring student understanding through quizzes.

The learning media offered by Quizizz provides several benefits that can be used to assess the progress of a class, including:

- a. More closed
This quiz has the option to be configured as a private quiz. Students are required to enter a six-digit code when answering questions specified by the instructor.
- b. Free
This app is available for free. However, subscriptions can be purchased for a fee.
- c. Several menus are available
This application has a variety of menus that educators can use based on the content or questions asked. Available options include: "multiple choice," "survey," "short answer," "open-ended," "series," "audio response," "video response," and "slides."

d. Homework menu available

The general timeframe for completing this homework menu is set at a maximum of two weeks.

e. Cannot cheat or collaborate with friends

In the context of this quiz, it is very important for students to avoid any form of cheating or collaboration, as the questions are assigned randomly, which ensures that each participant gets a unique question number.

f. Enables student competition through ranking

The incorporation of a ranking feature encourages increased enthusiasm and motivation among students, encouraging them to engage in the game, often without their awareness of the educational benefits they gain through the game.

g. Can use teaching materials from other users

This application allows educators and students to access quiz questions or materials prepared by other users, which are tailored to the subject matter being discussed.

h. Can create slides for presentations

This application offers interesting features for creating presentation slides.

i. After completing the questions, students have the opportunity to review and reflect on their answers. This allows them to assess the accuracy of the various answers.

In conclusion, the learning media mentioned above offer significant benefits that help educators implement effective learning processes. Furthermore, these media encourage teachers to be more creative in developing learning strategies, ensuring that they do not pose challenges during the learning process.

The next steps to take advantage of it are as follows:

A. Quizizz account creation procedure:

- 1) Before creating an account, make sure your internet connection is strong enough.
- 2) Please select the browser you use most often.
- 3) Access the website (<https://quizizz.com/admin>)
- 4) Proceed to register.
- 5) Please complete the account registration process or access your account using your email or Google credentials.
- 6) Next, you will see three options related to "how are you using Quizizz?": "at a school," "at a business," or "personal use." Select "at a school."
- 7) Next, there will be an additional option labeled "I am a," which displays the options "Teacher" and "Student." Please select "Teacher."

- 8) Your Quizizz account has been successfully created.
- B. Guidelines for formulating questions. Here is the procedure for creating them:
- 1) Make sure you have a reliable internet connection.
 - 2) Navigate to quizizz.com
 - 3) Navigate to the create menu and select "assessment."
 - 4) Next, a screen will appear for "assessment," "presentation," "interactive video," "analysis," and "flashcards." Please select the menu labeled "assessment."

Learning Outcomes

Student learning outcomes are an indication of how deeply students have understood the subject matter presented in class (Maisaroh & Rostrieningsih, 2018). Measuring content is crucial in assessing the effectiveness of the learning process. Various methods can be used to measure student learning outcomes, including tests, assignments, projects, presentations, and observations. Each approach has its own advantages and disadvantages, and often relying on a single method is preferable to obtaining a comprehensive picture of student achievement.

Through student learning assessments, we can measure their understanding of the topics covered. This includes the extent to which students grasp the concepts presented, their ability to connect and apply these ideas to real-world scenarios, and their proficiency in articulating and utilizing the knowledge they have acquired.

Furthermore, assessing student learning outcomes allows us to evaluate students' ability to apply the skills they have acquired. This includes students' capacity to complete assignments or projects, engage in critical thinking, make decisions, and communicate effectively. By evaluating these competencies, we can gauge how well students have developed the essential skills needed for everyday life and the professional world.

Besides serving as a tool for assessing individual students, measuring learning outcomes can also serve as a tool for evaluating the effectiveness of teaching strategies used by educators. By analyzing student learning outcomes, educators can determine whether the teaching methods used have successfully communicated the subject matter effectively, increased student understanding, and encouraged the development of their skills. Therefore, assessing student learning outcomes plays a crucial role in assisting educators in the process of reflection and continuous improvement of their teaching practices.

Student learning outcomes serve as a measure of how well students have achieved the stated learning objectives. In this context, learning outcomes can

be categorized into three main types: cognitive outcomes, affective outcomes, and psychomotor outcomes.

1. Cognitive learning outcomes emphasize the depth of students' understanding of the concepts and theories explored in their learning. This includes students' ability to remember, understand, implement, analyze, evaluate, or even generate new information (Aco Nasir, 2023). For example, cognitive learning outcomes can be measured through tests or assignments that ask students to explain mathematical concepts, understand physics theories, or apply chemistry principles in everyday practical situations.
2. Affective learning outcomes relate to changes in students' attitudes, values, and beliefs as a result of learning (Adriano & Rasto, 2019). This encompasses emotional aspects, moral values, and student beliefs, which can change or develop throughout the learning process. For example, affective learning outcomes can be seen in changes in students' attitudes toward their environment, improvements in moral values, or the development of self-confidence.
3. Finally, psychomotor learning outcomes highlight students' ability to apply the physical or motor skills they have learned. (Supiadi et al., 2023). This includes a student's ability to perform tasks or activities involving physical or motor skills, such as playing a musical instrument, participating in sports, or operating machinery. Measurements in psychomotor studies are often obtained through direct observation of students as they perform tasks or activities involving physical or motor skills.

The factors that influence student learning outcomes play a crucial role in education, as they directly impact academic achievement and overall student development. Internal factors such as motivation, cognitive abilities, and emotional states play a crucial role in determining how well students absorb, understand, and process the information they learn. High motivation can be a powerful catalyst for students, inspiring them to study diligently and commit fully to achieving higher achievement. Conversely, cognitive abilities, including intellectual capacity and understanding of subject matter, play a crucial role in shaping students' abilities to face academic challenges.

In addition to internal factors, external factors also play a crucial role for students. Family support, effective guidance, encouragement, and the creation of a conducive learning environment at home can provide a strong foundation for student academic achievement. The school environment plays a crucial role, as adequate facilities, effective teaching methods, and high-quality educators

can create a learning environment that encourages student achievement. Furthermore, engagement with fellow students significantly influences motivation and learning capacity, as social support and group dynamics are integral to the learning process.

The teaching aspect should also not be overlooked. Innovative and interactive teaching approaches that align with students' needs can spark their interest in learning and enhance their understanding of the subject matter. Constructive feedback from educators provides crucial guidance for students to address their weaknesses and improve their academic performance. Ultimately, curriculum elements, including the relevance of subject matter to real-life situations and the need to employ diverse learning approaches, play a crucial role in fostering an inclusive educational environment that recognizes the unique needs of each student. By focusing on and understanding these factors, educators can design more effective learning strategies geared toward holistic student development.

CONCLUSION

Research findings and discussions surrounding the impact of Quizizz as a learning medium on the academic achievement of class X TKJ students at a private vocational school in Jambi, Medan, indicate that Quizizz significantly improves student learning outcomes. The Mann-Whitney U test results show a significance value of less than 0.05 in both learning sessions, thus strengthening the acceptance and empirical validation of the research hypothesis.

Quizizz as a learning medium has shown significant improvements in student learning outcomes compared to traditional educational methods. In the first meeting, the experimental class achieved an average posttest score of 83.20, exceeding the control class' average of 70.67 by 12.53 points. In the second meeting, the experimental class recorded an average score of 81.96, exceeding the control class by 8.29 points, with an average of 73.67. The difference in learning outcomes between the two classes showed a significant level of statistical significance.

Quizizz's effectiveness was significantly higher for basic concepts compared to more complex material; however, both categories showed a significant positive impact. These results indicate a significant difference in learning outcomes between students who used Quizizz and those who followed traditional learning methods.

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