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THE USE OF EDUCATIONAL GAMES AS AN EVALUATION TOOL IN PRIMARY SCHOOL SCIENCE LEARNING

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ABSTRACT

This study aims to analyze the use of educational games as an evaluation tool in science learning in elementary schools. The method used is a literature study with a qualitative approach, where data is obtained from various journals, articles, and relevant documents. The results showed that educational games such as Educandy, Wordwall, Kahoot, and Quizizz effectively increase student engagement, motivate learning, and support 21st century skills. Educational games make evaluation more engaging, provide instant feedback to teachers and help design optimal learning. Nonetheless, their implementation still faces challenges, such as lack of technological literacy, limited digital devices, and the need to adapt applications to the curriculum. This study concludes that educational games are effective and relevant evaluation media to support science learning in elementary schools. Further development is needed so that this technology can be optimally utilized in improving the quality of education in the digital era.

Keywords : educational games; learning evaluation; science; elementary school; educational technology.

INTRODUCTION

Science is a science that deals with natural and material symptoms that are systematic, arranged in an orderly manner, generally applicable in the form of a collection of observations and experiments (Winangun, 2020). In order for science learning objectives to be achieved, Natural Sciences (IPA) needs to be evaluated appropriately and involve students actively. This is related to the accuracy of the use of evaluation tools in learning Natural Sciences (IPA) in elementary schools (Kusumah et al., 2020).

Educational games are basically a combination of entertainment content that aims to facilitate students in learning. Some ways of doing this educational game- based learning, namely learning through a computer screen or *smartphone* with full of images and animated designs. This can convince students that learning can be fun. Such learning is expected to have a positive impact on learning activities and can attract students' interest in learning (Pratama & Setyaningrum, 2018).

Learning media is anything that can be used to channel the sender's message to the receiver, so that it can stimulate the thoughts, feelings, attention, and interest of students to learn (Tafonao, 2018). Learning media is a teaching aid that contributes to influence, motivation, conditions, and learning environment. The use of learning media at the orientation stage of teaching will greatly assist the effectiveness of the learning process and the delivery of messages and lesson content at that time. (Hayes et al., 2017)

Educational games have elements of education and entertainment. Educational games can be divided into several types, such as videos, computer games, music, movies, websites, and other multimedia. This educational game is considered as a tool to improve the quality of teaching and learning (Lestari et al., 2020).

The use of mobile devices is gaining popularity in the world of education, both as learning media and evaluation media. Learning evaluation is the process of making decisions on a learning objective. Evaluation of the implementation of science learning aims to collect information about the implementation of learning which will be used as an alternative in making decisions (Yunus et al., 2016). Evaluation of learning

implementation is a decision-making process towards a learning objective. Evaluation serves as an assessor of the success of the learning process, and also measures the extent of the achievement of students' competence towards one or more learning objectives. So that with the evaluation can be used as a consideration for making improvements and improving the quality of learning.

Although several media applications support the integration of technology in learning, their use in science learning in elementary schools is still not optimal. In real classroom conditions, many teachers still rely on conventional evaluation methods such as written tests, and the use of educational game applications has not been widely implemented as a learning evaluation tool. Meanwhile, mobile devices such as smartphones actually have advantages because they can be accessed anytime and anywhere, which potentially supports more interactive and engaging learning evaluations (Sulisworo & Muqoyyanah, 2018).

This condition shows a gap between the potential of educational game technology and its actual implementation in science learning evaluation in elementary schools. Therefore, it is important to examine how educational games can be used as an evaluation tool in science learning. Based on this background, the problem of this study is how the use of educational game-based applications can support the evaluation of science learning in elementary schools.

METHOD

This research is a literature study, also known as literature research. Literature study is a research activity conducted by collecting various kinds of information and data from several sources such as books, scientific articles, and journals related to the research problem and objectives (Melinda & Zainil, 2020).

The literature analyzed in this study includes several journal articles related to the use of educational games and technology-based evaluation in learning, such as "The Use of Educandy in the Evaluation of Indonesian Language Learning" by Ulya (2021) published in the Journal of Indonesian Language and Literature Education, and "Use of Science Learning Evaluation Tools Supporting 21st Century Skills" by Nengsih et al. (2022) published in the ESABI Journal: Journal of Biology Education and Science. These studies were used as references to analyze the implementation of educational game applications and technology-based evaluation tools in learning.

The approach used in the research is a qualitative approach. The data collection technique used is using documentation techniques from various data sources in the form of documents, journals or books relevant to the research. The data analysis used in this research uses descriptive analysis method, which is a regular description of the data that has been obtained, then given an understanding and explanation so that it can be understood properly by the reader.

FINDINGS/RESULTS AND DISCUSSION

Based on the results of the literature study, 5 scientific articles were obtained related to the use of educational games as a learning evaluation tool. The results of the analysis of each scientific article can be seen in table 1.

Table 1. Analysis results of scientific articles

No	Article Title	Journal	Research Results
1.	The Use of Educandy in the Evaluation of Indonesian Language Learning (Ulya, 2021)	Journal of Indonesian Language and Literature Education	The results showed that the frequency of using the game in the evaluation was 90%, and the satisfaction level of using educandy was 95%. Educandy as an educational game in learning Indonesian has many types of word games that can be played, making it easier for teachers to make varied quizzes, and making practice questions more fun.

2.	Use of Science Learning Evaluation Tools Supporting 21st Century Skills (Nengsih et al., 2022)	ESABI JOURNAL: Journal of Biology Education and Science	The results showed several modern technology-based evaluation tools that can be used by teachers in evaluating student learning such as kahoot, quizizz, googleform, wondeshare quiz creator, instragram applications in the form of microblogs, android applications and so on. These applications can be used by teachers in evaluating the learning process that supports 21st century skills, especially in science subjects.
3.	Evaluation Based on Wordwall Educational Game to Improve Critical Thinking of Generation Z Class X Students at Smk Pasundan 1 Serang City (Fajriani et al., 2023)	Journal of Education and Teaching Review	Wordwall offers new innovations in assessment activities that attract students' attention with a complete application design and easy to use by teachers. Wordwall educational game has effectiveness in improving critical thinking of generation z students in class X at SMK Pasundan 1 Serang City.

4.	Implementation of Edulastic Media as an Assessment Instrument in Explanatory Text Learning at SMP Negeri 2 Semarang (Wahyuni et al., 2023)	Concept: Journal of Social Humanities and Education	The results showed that Edulastic can be used as a medium to present assessment instruments in learning. Edulastic helps teachers in accelerating the process of student assessment because results can be obtained immediately when students finish taking the test. Teacher can also directly identify the difficulties or obstacles faced by students based on the test results that have been carried out. This can be used as a basis by teachers to determine follow- up to the learning process and design optimal learning for students.
5.	Application-based E-Assessment Model for High School in the Digital Age: A Systematic Literature Review	Journal of Islamic Education	21st century learning allows technology-based learning which is now growing rapidly. These technological developments encourage various developments, including in the field of assessment. The E-Assessment model through applications can be applied in digital learning to improve student skill and competencies. The

			application-based E-Assessment model can be developed with several supporting applications, such as moodle, quizizz, kahoot, and others. These applications can be developed according to the needs, situation and conditions of the school environment. This means that educators and institutions must consider the suitability of the application with the field facts in the school so that the use of the application for E-assessment can be optimized.

Examples of Educational Game Applications in Science Learning

To elucidate the practical application of these educational games as formal evaluation instruments, several interfaces of prominent platforms are delineated below. These platforms integrate distinct gamification elements that are explicitly tailored to accommodate the active and visually oriented cognitive profiles characteristic of elementary school students.

1. **Kahoot!**

   Kahoot! is predominantly utilized to design competitive and interactive formative assessments. In the context of science evaluation, educators can project stimuli such as questions accompanied by visual representations of natural phenomena onto a primary display. Concurrently, students submit their responses utilizing corresponding color-coded interfaces on their mobile devices.

This synchronous approach fosters a highly engaging and dynamic evaluative environment, thereby increasing student participation.

A recent study demonstrated that this synchronous approach fosters a highly engaging evaluative environment, thereby significantly increasing student enthusiasm and mitigating learning boredom during the assessment process (Prihatini et al., 2024).

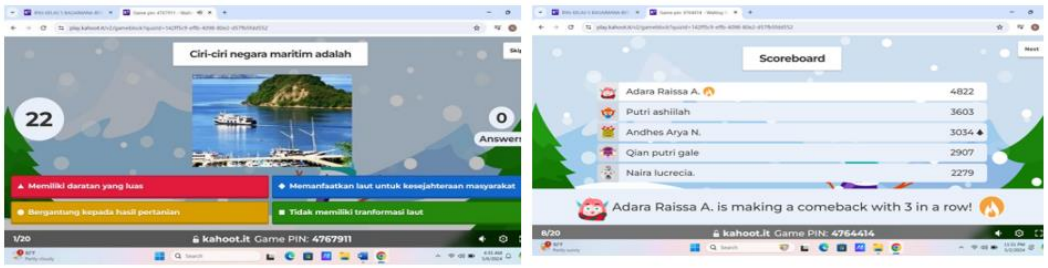

Figure 1. Kahoot! interface illustrating an elementary science inquiry about maritime characteristics and the corresponding student performance scoreboard *(Source: Prihatini et al., 2024).*

2. Quizizz

In contrast to the instructor-paced, synchronous model typical of Kahoot!, Quizizz facilitates asynchronous, student-paced evaluations. The platform integrates distinct gamification elements, including avatars, automated feedback memes, and performance multipliers (power-ups). The integration of these features serves to mitigate test-related anxiety significantly, whilst simultaneously generating comprehensive analytical reports regarding student accuracy and overall performance for the educators.

A recent systematic literature review highlights that the integration of Quizizz's gamification elements significantly enhances student motivation and enthusiasm, effectively reducing test-related anxiety while improving overall learning outcomes and comprehension of IPAS concepts (Nurjanah & Rahayu, 2025)

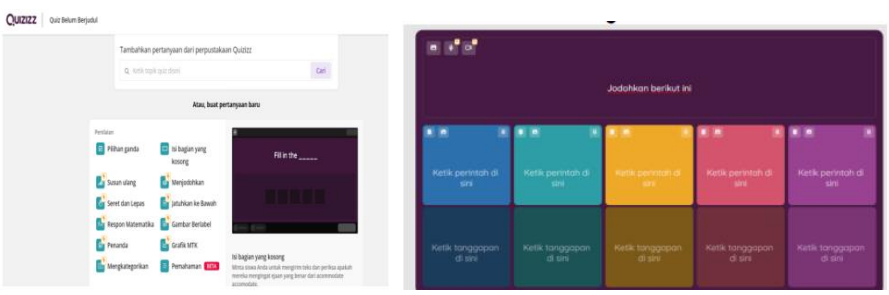

Figure 2. Various interactive assessment formats available on the Quizizz platform, such as multiple-choice, matching, and categorizing tasks utilized in elementary IPAS evaluation *(Source: Nurjanah & Rahayu, 2025).*

3. **Wordwall**

Wordwall provides a versatile array of customizable assessment templates, encompassing interactive match-ups, anagrams, and categorization exercises. Within the scope of elementary science education, this application proves highly efficacious for measuring students' acquisition of scientific concepts and terminologies. For instance, it can be optimally deployed for evaluative tasks that require the classification of animal species or the anatomical identification of plant structures.

Recent research demonstrates that utilizing Wordwall as an evaluation medium not only significantly improves students' comprehension but also fosters a highly active, focused, and joyful evaluative atmosphere in the classroom (Nafian et al., 2024).

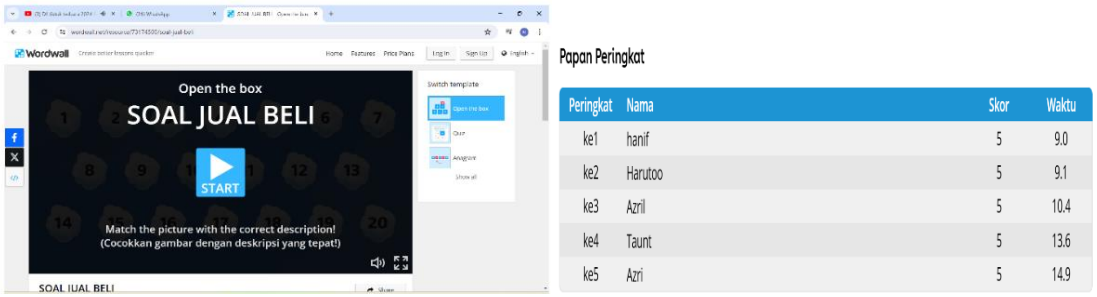

Figure 3. Wordwall interactive evaluation interface. *(Source: Nafian et al., 2024).*

Relevance of Educational Games as Evaluation Media in Science Learning

Based on the data obtained, integrating educational games as an evaluation tool in science learning shows great potential to increase student engagement, provide interesting learning experiences and support 21st century skills. Several applications such as Educandy, Wordwall, Kahoot, and Quizizz show positive results in learning evaluation in various subjects, including science. The use of these educational games can provide an interesting evaluation alternative to traditional methods, making the assessment process more interactive and effective. Learning evaluation is a systematic process to obtain information about the effectiveness of learning activities in helping students achieve predetermined goals optimally (Al-faruq, 2023)

Advantages of Educational Games in Learning Evaluation

1. Interactive and engaging

   Apps such as Educandy, Wordwall, and Kahoot create an interactive learning experience through attractive visual design, various types of games, and an instant evaluation system. For example, Ulya's research shows that 90% of students find games helpful in evaluation, and the satisfaction rate reaches 95% (Ulya, 2021) . This shows the effectiveness of educational games in arousing students' interest in learning.

2. Efficiency and Practicality

   Applications such as Edulastic allow teachers to obtain evaluation results directly after students complete the test. Teachers can also immediately analyze student constraints and develop better lesson plans (Wahyuni et al., 2023) . This practicality not only reduces teachers' administrative burden but also increases responsiveness to students' needs.

3. 21st Century Skills Development

   Technology-based evaluation supports students' critical thinking, communication, collaboration and creativity skills. Wordwall is effective in improving Generation Z students' critical thinking skills. In addition, the use of applications such as Kahoot, Moodle, and Quizizz encourages mastery of technology that is relevant in the digital era (Nengsih et al., 2022; Wahyuni et al., 2023).

Challenges of Using Educational Games in Science Evaluation

Although educational games offer many benefits, their implementation still faces several obstacles, including:

1. Lack of Technology Utilization

   Digital devices such as smartphones have not been optimally utilized for learning, especially in science evaluation. This obstacle can be caused by the lack of technological literacy among teachers and students (Sulisworo & Muqoyyanah, 2018) .

2. Suitability to Curriculum and School Environment

   The use of applications must be tailored to the needs, situation, and conditions of the school to be optimal. Application-based E-assessment models, such as

Moodle and Quizizz, require further analysis regarding their compatibility with the applied curriculum (Lestari et al., 2020).

3. Accessibility and Infrastructure

   Not all schools have access to adequate technological devices. This limits the application of educational games, especially in areas that do not have adequate internet facilities.

Based on these descriptions, it can be concluded that educational games provide a great opportunity to improve the quality of science learning evaluation by emphasizing learning experiences that are interactive, efficient and relevant to technological developments. However, more effort is needed to overcome challenges such as technology accessibility and curriculum compatibility. This study provides a basis for further development of educational game-based evaluation applications, particularly to support science learning in elementary schools.

CONCLUSIONS

Based on the results of the literature study, it can be concluded that educational games have great potential as a science learning evaluation tool in elementary schools. Educational games not only make the evaluation process more interactive and interesting, but also help students to be more motivated in learning. Apps such as Educandy, Wordwall, Quizizz, and Kahoot have been proven to provide positive results in increasing learning interest, critical thinking, and 21st century skills. However, the implementation of educational games still faces several challenges, such as limited access to technology, lack of technological literacy among teachers and students, and the need for compatibility with the curriculum and school environmental conditions. Therefore, training and mentoring is needed for educators
to optimally utilize this technology.

This research is expected to be a reference for educational practitioners in developing more innovative and effective technology-based learning media. In addition, the development of educational game applications as an evaluation tool needs to be continued in order to support the improvement of the quality of science learning in the digital era. With this step, it is expected that learning in elementary

schools will become more meaningful, relevant, and able to equip students with competencies that are in accordance with the needs of the times.

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