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DEVELOPMENT OF MATHEMATICS LEARNING EVALUATION INSTRUMENTS USING QUIZIZZ AT SMP NEGERI 4 BOLAANG

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ABSTRACT
The research was motivated by the low achievement of mathematics students at SMP Negeri 4 Bolaang, only 35% of students managed to achieve the Minimum Completeness Criteria (KKM) in integer material. The evaluation method applied so far is considered to be less able to measure students' understanding as a whole. Valid, effective, and practical evaluation tools are important to improve students' mathematics learning outcomes, so the purpose of this study is to develop a mathematics learning evaluation instrument based on the Quizizz application using the ADDIE model which includes the stages of Analysis, Design, Development, Implementation, and Evaluation. The instrument is validated by material and media experts, and tested for practicality and effectiveness. The results of the study showed that the validation test had a score of 86%, the practicality test obtained an average score of 89% and the effectiveness test obtained an average score of 87.5% of students managed to achieve the KKM which concluded that the Quizizz evaluation tool was included in the category of Valid, Practical and Effective.
Keywords: *evaluation instruments, quizizz, ADDIE,*

ABSTRAK
Penelitian yang dilatarbelakangi oleh rendahnya prestasi belajar matematika siswa di SMP Negeri 4 Bolaang hanya 35% siswa yang berhasil mencapai Kriteria Ketuntasan Minimal (KKM) pada materi bilangan bulat. Metode evaluasi yang diterapkan selama ini dianggap kurang mampu mengukur pemahaman siswa secara menyeluruh . Alat evaluasi yang valid, efektif, dan praktis penting untuk meningkatkan hasil belajar matematika peserta didik sehingga tujuan kajian ini untuk mengembangkan instrumen evaluasi pembelajaran matematika berbasis aplikasi Quizizz dengan menggunakan model ADDIE yang meliputi tahapan Analisis, Desain, Pengembangan, Implementasi, dan Evaluasi. Instrumen divalidasi oleh ahli materi dan media, serta diuji untuk mengetahui tingkat kepraktisan dan keefektifannya. Hasil penelitian menunjukan uji validasi memiliki skor 86%, uji kepraktisan memperoleh skor rata-rata 89% dan uji keefektifan memperoleh skor rata-rata 87.5% siswa berhasil mencapai KKM yang menyimpulkan alat evaluasi Quizizz termasuk dalam kategori Valid, Praktis dan Efektif.
Kata kunci*: instrumen evaluasi, quizizz, ADDIE,*

Introduction

Pendidikan sebagai bentuk upaya menghasilkan sumber daya manusia yang unggul yang dapat membantu masyarakat dalam mengubah pengetahuan, perilaku, dan kemampuan (Lubis, dkk., 2025). Education is the main foundation in the development of science and technology, with mathematics as the basis for

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understanding other disciplines (Domu & Mangelep, 2019; Lolowang & Tumimomor, 2021). In the context of learning, evaluation plays a crucial role in measuring the achievement of educational goals, mapping student understanding, and improving teaching strategies (Idrus, 2019; Salsabila, dkk., 2020). Student understanding itself covers three domains: cognitive, affective, and psychomotor, which require holistic evaluation instruments (Domu & Mangelep, 2020). However, conventional monotonous evaluation methods are often unable to address this complexity. Research (Huljannah, 2021) shows that the repetition of traditional evaluation techniques has the potential to reduce student motivation, especially in abstract subjects such as mathematics.

Technological developments offer opportunities to overcome these limitations through a more interactive approach. Gamification-based applications such as Quizizz, for example, have been recognized for their ability to increase student engagement through attractive evaluation designs (Amornchewin, 2018; Fitri et al., 2020; Ningsih, 2025). Features such as scoreboards, timers, and instant feedback not only make the assessment process more dynamic but also facilitate conceptual understanding (Purba, 2019). Previous studies have even proven that Quizizz is effective in improving mathematics learning outcomes by combining elements of play and independent learning (Afifah & Hasanudin, 2023; Rozi & Hanum, 2019; Dilah, 2019). However, the systematic implementation of Quizizz-based assessment instruments, especially for specific materials such as integers, is still rarely developed. In fact, research in schools with similar challenges shows that technology-based evaluation instruments can significantly improve minimum competency standards when designed in a structured manner (Fitri et al., 2020).

Findings at SMP Negeri 4 Bolaang reinforce the urgency of this innovation. Based on interviews and daily tests, only 35% of students achieved the minimum passing grade for integer material. This indicates that the conventional evaluation methods used so far have not been able to accommodate students' learning needs. In fact, technology-based evaluation instruments such as Quizizz not only increase motivation but also allow for adjustments according to the characteristics of the material (Fitri et al., 2020). The novelty of this research lies in the development of a Quizizz-based mathematics evaluation instrument that is systematically designed for integer material, with a focus on three criteria: (1) tested content validity, (2) practicality in implementation, and (3) effectiveness in improving learning outcomes. The purpose of this study is to develop such an evaluation instrument and assess its validity, practicality, and effectiveness in learning at SMP Negeri 4 Bolaang .

Research Methods

This study is categorized as research and development (R&D) that applies the ADDIE model as its main framework. The ADDIE model consists of five important stages, namely Analysis, Design, Development, Implementation, and Evaluation (Hidayat & Muhamad, 2021). In the Analyze stage, researchers analyzed learning process requirements through interviews with classroom teachers. Then, in the Design stage, they identified KI and KD, created learning indicators and objectives, and designed mathematics evaluation tools.

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During the Development stage, a product was developed in the form of an evaluation instrument based on the Quizizz application. In addition, during this stage, the validity/feasibility of the developed material, language, and media was also tested.

During the Implementation stage, the researcher began to use the developed product in the learning evaluation process. The product was tested on eight seventh-grade students at SMP Negeri 4 Bolaang. Practicality testing was carried out by distributing response questionnaires to teachers and 15 seventh-grade students. The Evaluation stage was carried out in the form of a formative test. The effectiveness of the evaluation instrument was also tested at this stage. The evaluation criteria for this Quizizz application-based product were based on the results of tests of validity, practicality, and effectiveness.

The variables measured in the development of evaluation instruments generally cover three main aspects in accordance with the stated research objectives, namely validity, practicality, and effectiveness. The research subjects included 1 lecturer from the Mathematics Department as a subject matter expert, 1 lecturer from the Mathematics Department as a media expert, 1 subject teacher, and 8 students. Data were collected using interview techniques in the pre-research, questionnaires, and tests. The data collection instruments used included validation sheets from subject matter and media experts, response questionnaires from teachers, response questionnaires from students, and student learning outcome tests. Table 1 presents the validity and practicality test indicators.

Table 1. Validity and Reliability Test Indicators

Validity		Practicality
Material	Media	
Conformity of the material with Core Competencies (KI) and Basic Competencies (KD)	Compatibility of layout, color, and font with the characteristics of the learner	*Quizizz* makes it easier for me to evaluate students
Instructions for working on questions are easy for students to understand	Clarity of navigation and responsibility of media elements	*Quizizz* Effectively Increases Students' Motivation in Learning Mathematics
Accuracy of the material to the concept of Mathematics	Compatibility with devices (PCs, tablets, smartphones)	I can monitor student progress more easily with *Quizizz*
Variety of question types (multiple choice, short fill, etc.)	Use of innovative elements (e.g. avatars, memes, music)	Using *Quizizz* is practical and doesn't take much time
The material is according to the student's cognitive level	The level of ease of teachers and students in using the media	*Quizizz* provides quick and useful feedback for students

Data analysis is carried out by combining quantitative and qualitative approaches. Qualitative data was collected through various inputs and suggestions provided by subject matter experts and media during the validation phase. On the other hand, quantitative information was obtained from the results of assessments on the validation sheets by experts as well as from teacher and student response

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questionnaires, including the scores of student learning outcomes. This data analysis aims to assess the extent to which the Quizizz-based evaluation tool meets the validity criteria, based on the materials and teaching materials that have been designed. Furthermore, quantitative data from the validation sheets and questionnaires were analyzed using statistical methods to calculate the total score which became an assessment of the level of validity and practicality of the evaluation device. This process is carried out by applying the following formula:

$$P = \frac{f}{N} \times 100\%$$

Information:
P = percentage of data
f = total score obtained
N = maximum total score

The level of validity and practicality of the development of evaluation instruments using the Quizizz application can be obtained from the following percentage of results:

Table 2. Questionnaire Assessment Intervals and Criteria

Interval	Criterion
85% ≤ x ≤ 100%	Highly valid/Practical
70% ≤ x < 85%	Valid/Practice
55% ≤ x < 70%	Quite valid/Practical
40% ≤ x < 55%	Invalid/Practical
0% ≤ x < 40%	Very Invalid/Practical

Meanwhile, for testing the effectiveness of the Quizizz evaluation instrument collected through student learning outcome data, it is categorized as effective if the level of completeness of student learning outcomes exceeds 75.

Results and Discussion

1. Analysis

This stage of analysis aims to identify learning needs through interviews with mathematics teachers and classroom observations. The results of the analysis show that teachers still use conventional paper-based evaluations, which causes difficulties in assessing the objectivity of students' answers due to the practice of cheating. Based on these findings, the researcher decided to develop an app-based learning evaluation tool Quizizz in the hope of increasing students' interest in participating in the evaluation and reducing boredom when working on evaluation questions. The use of this application is expected to provide a more interesting and objective learning atmosphere.

2. Design

At the design stage, learning outcomes are identified, learning objectives are prepared, and question grids are made. The material raised focuses on integers in accordance with the Independent Curriculum.

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3. Development

The development stage is the process of making products in the form of evaluation tools based on the Quizizz application. Previously, at SMP Negeri 4 Bolaang, the evaluation tool used was still in the form of paper media. Therefore, the researcher innovated by changing the evaluation tool to be based on information technology through the use of the Quizizz application. In this process, the evaluation instrument is created in the form of multiple-choice questions that are integrated into Quizizz. Furthermore, the instrument went through a validation process carried out by two experts, namely material experts and media experts.

4. Implementation

The implementation stage is the stage where the researcher begins to apply the product that has been developed in the context of evaluating the learning process. At this stage, the instrument that has been made is tested on 8 grade VII students at SMP Negeri 4 Bolaang. In addition, teachers and students are given questionnaires or questionnaires to assess the extent to which the instrument is practical and easy to use in learning activities. At the implementation stage, an effectiveness test of the Quizizz evaluation instrument was also carried out, namely by providing learning outcome tests to students.

5. Evaluation

The feasibility of the Quizizz application-based evaluation product is determined based on the calculation of the validity, practicality, and effectiveness indicators of the product. The validity of the product that has been developed is then reviewed by validators consisting of material experts and media experts. This validation process includes one mentoring session as well as one revision from each expert. The results of the validation carried out by the subject matter experts can be seen in the following Table 3:

Table 3. Analysis of Material Expert Validation Results

No	Assessment indicators	Skor	P (%)	Validity level
1.	Suitability of the material with Core Competencies (KI) and Basic Competencies (KD)	4	80 %	Proper
2.	Instructions for working on questions are easy for students to understand	4	80 %	Proper
3.	Accuracy of the material to the concept of Mathematics	4	80 %	Proper
4.	Variety of question types (multiple choice, short fill, etc.)	4	80 %	Proper
5.	The material is according to the student's cognitive level	4	80 %	Proper
Total		**20**	**80 %**	**Valid**

Based on Table 3, the validation reaches the interval level $70\% \leq x < 85\%$ with a total of 80% declared valid. And it was declared worthy of trial without revision.

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Table 4. Analysis of Media Expert Validation Results

No	Assessment indicators	Skor	P (%)	Validity level
1.	Compatibility of layout, color, and font with the characteristics of the learner	4	80 %	Proper
2.	Clarity of navigation and responsibility of media elements	4	80 %	Proper
3.	Compatibility with devices (PCs, tablets, smartphones)	5	100 %	Highly Worth It
4.	Use of innovative elements (e.g. avatars, memes, music)	5	100 %	Highly Worth It
5.	The level of ease of teachers and students in using the media	5	100 %	Highly Worth It
Total		**23**	**92 %**	**Highly Valid**

Based on Table 4, the validation results reached the interval level $85\% \leq x < 100\%$ with a total of 92% which was declared to be very valid. Thus the evaluation instrument product can be used in accordance with the given revision.

The level of ease of use of the Quizizz application-based evaluation tool was measured through the distribution of response questionnaires to teachers and grade VII students at SMP Negeri 4 Bolaang. The results of the assessment of the teacher's response questionnaire are presented in Table 5.

Table 5. Assessment Results of the Teacher Response Questionnaire

No	Question	Score	P (%)	Level of Practicality
1.	*Quizizz* makes it easier for me to evaluate students	5	100 %	Strongly agree
2.	*Quizizz* Effectively Increases Students' Motivation in Learning Mathematics	5	100 %	Strongly agree
3.	I can monitor student progress more easily with *Quizizz*	4	80 %	Agree
4.	Using *Quizizz* is practical and doesn't take much time	5	100 %	Sangat Setuju
5.	*Quizizz* provides quick and useful feedback for students	4	80 %	Agree
	Total	**23**	**92 %**	**Strongly agree**

Based on Table 5, the results of the teacher response questionnaire reached a total of 92% which was stated to be very agreeable or very practical. Then the results of the assessment of the student response questionnaire are as follows:

Table 6. Recapitulation of Student Response Assessment Results

No	Response Name	Shoes Valuation	Level of Practicality
1.	AY	83	Agree
2.	FG	83	Agree
3.	FS	87	Strongly agree
4.	MK	83	Agree
5.	MU	83	Agree
6.	PG	83	Agree
7.	SH	87	Strongly agree
8.	ZP	80	Agree
	Rata-Rata	**84**	**Setuju**

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Based on Table 6, the recapitulation of the results of the teacher response questionnaire reached a total of 84 who were declared to agree or be practical. So that the products developed are practical. The level of effectiveness of the evaluation instrument using the Quizizz application from 8 students showed that 7 participants had successfully achieved KKM, while 1 participant had not achieved it. Table 7 below shows that the average score of participants was 93.25 with a completion percentage of 87.5%, which shows that the instrument is very effective.

Table 7. Student Test Results

No	Response Name	Shoes Valuation	Completeness Level
1.	AY	90	Finished
2.	FG	100	Finished
3.	FS	74	Unfinished
4.	MK	100	Finished
5.	MU	100	Finished
6.	PG	100	Finished
7.	SH	87	Finished
8.	ZP	95	Finished
Sum		**746**	
Average		**93,25**	

Table 7 shows that the average learning outcomes of students reached 93.25 with 7 out of 8 students declared complete. The calculation of the percentage of effectiveness is as large as the declared effective. 87.5%The final appearance of the evaluation instrument is shown in Figure 1 below:

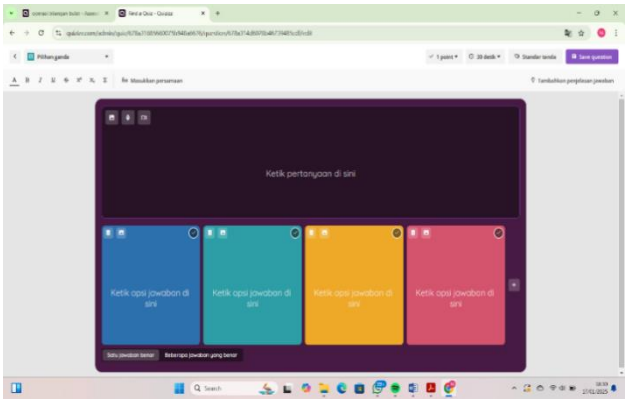

Figure 1. View for editing quizzes

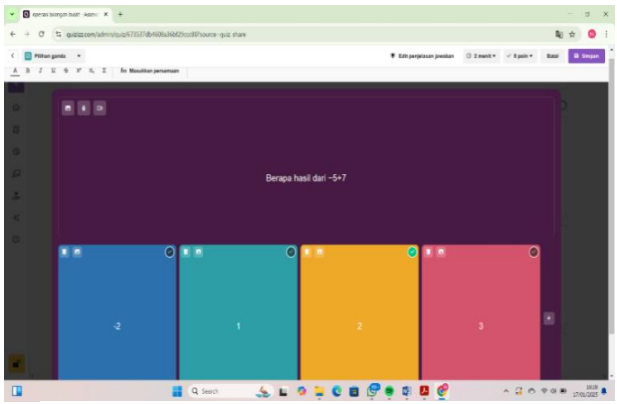

Figure 2. Question item display and answer

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The development of a Quizizz-based evaluation instrument in this study resulted in a material validity level of 80% and media validity of 92%. This figure shows that the instrument has met the valid criteria, although it is slightly lower than the research of Hamidah & Wulandari (2021) which achieved 94% validity. This difference occurs because the researcher focuses on more contextual social arithmetic material, while Miske's research focuses on the HOTS (*Higher Order Thinking Skills)* instrument. However, the higher media validity of 92% compared to the study (Jahring et al., 2022) which recorded 86.6%) confirms that Quizizz's interactive and adaptive interface design is able to increase the acceptance of the instrument.

From the practical aspect, this instrument received a positive response from teachers by 92% and students by 84%. A higher level of teacher practicality than usual indicates that teachers are more helped by Quizizz's auto-correction feature and real-time data analysis, while students still face technical constraints such as unstable internet connections. This finding is in line with research (Kristanto & Yunianta, 2021) which states that the practicality of Quizizz is highly dependent on supporting infrastructure. The novelty in this study lies in the proposed mitigation strategies, such as the use of Quizizz offline mode and the sharing of device access groups, which were not found in previous studies. In terms of effectiveness, this instrument succeeded in increasing the achievement of KKM by 87.5%, higher than the research (Matovani et al., 2022) which recorded 83.33%. This success is supported by the systematic development of instruments using the ADDIE model.

Conclusion and Suggestion

The development of this evaluation instrument follows the ADDIE model, which consists of five main stages, namely Analysis, Design, Development, Implementation, and Evaluation. Based on the results of the questionnaire, the level of practicality of the Quizizz-based evaluation tool showed that the teacher's response reached a percentage of 92%, while the response from students was at 84%. The overall average of 89% placed this tool in the "Very Practical" category, so it was declared suitable for use as an evaluation instrument.

As for assessing its effectiveness, the student's test results showed an achievement of 87.5%, which was included in the "Very Effective" category. Therefore, it can be concluded that this evaluation tool is not only practical, but also very effective in supporting the Mathematics learning process.

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