

# Nearpod Application-Based Diagnostic E-Assessment Interest in Learning Mathematics for Grade 4 Elementary School Students

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## ABSTRAK

Assesmen diagnostik di sekolah dasar masih menggunakan media kertas dan masih jarang guru memanfaatkan teknologi dalam pembuatan atau pengaplikasian assesmen di kelas. Peran guru adalah sebagai sumber utama siswa dalam pembelajaran dikelas, sehingga guru harus menciptakan pembelajaran yang kreatif khususnya dengan menggunakan teknologi. Jenis penelitian yang digunakan yaitu penelitian pengembangan yang bertujuan untuk mengembangkan suatu produk penilaian elektronik diagnostik untuk meningkatkan minat belajar matematika siswa sekolah dasar serta mengukur kelayakan, kepraktisan dan keefektifan penilaian elektronik yang telah dikembangkan. Populasi dalam penelitian ini merupakan salah satu lembaga di suatu daerah, sedangkan sampel penelitian penelitian uji coba skala kecil diambil 5 anak dan uji coba skala besar sebanyak 21 anak. Sampel diambil pada kelas 4 SD. Pengumpulan data dalam penelitian ini menggunakan validasi ahli, angket dan kuisioner checklist. Peneliti menguji keabsahan data dengan menggunakan uji validitas ahli dan angket respon siswa beserta guru. Hasil N-Gain tes awal dan tes pasca dengan rerata 0,75. Berdasarkan hasil tersebut dapat diketahui bahwa dengan memanfaatkan teknologi terdapat dapat meningkatkan minat belajar siswa, hal tersebut dapat dilihat dari peningkatan yang signifikan dari hasil belajar siswa. Selain itu siswa juga dapat belajar sambil bermain dengan memanfaatkan teknologi yang ada. Implikasi penelitian ini dapat mendorong guru untuk mengadopsi teknologi pembelajaran yang lebih interaktif dan berbasis data, di mana aplikasi Nearpod memungkinkan guru memberikan umpan balik secara real-time serta memantau kesulitan belajar siswa secara individual.

## ABSTRACT

Diagnostic assessments in elementary schools still use paper media and teachers rarely use technology in making or applying assessments in the classroom. The role of the teacher is as the main source of students in learning in class, so teachers must create creative learning, especially by using technology. The type of research used is development research which aims to develop a product electronic assessment diagnostics to increase elementary school students' interest in learning mathematics and measure feasibility, practicality and effectiveness electronic assessment which has been developed. The population in this study was one institution in an area, while the research sample for the small-scale trial was 5 children and the large-scale trial was 21 children. Samples were taken in 4th grade of elementary school. Data collection in this research used expert validation, questionnaires and checklist questionnaires. Researchers tested the validity of the data by using expert validity tests and student and teacher response questionnaires. N-Gain Results initial test And post test with a mean of 0.75. Based on these results, it can be seen that by utilizing technology it is possible to increase students' interest in learning, this can be seen from the significant increase in student learning outcomes. Apart from that, students can also learn while playing by utilizing existing technology. The implications of this research can encourage teachers to adopt more interactive and data-based learning technology, where the Nearpod application allows teachers to provide real-time feedback and monitor individual student learning difficulties.

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## 1. INTRODUCTION

Assessment is a fundamental component in the teaching and learning process. Assessment triggers knowledge progress, measures and determines learning outcomes (Ambarwati et al., 2019; Giati & Aufa, 2020). Evaluation (assessment) is one of the tools used as a program to develop student potential in the learning process. Assessment must be holistic, covering all aspects of learning objectives, namely cognitive, affective and psychomotor aspects. This is because assessment has an important role, namely as a determinant of success and failure and can influence students in developing potential in the teaching and learning process at the next stage (Achmad Efendi et al., 2022; Widyasari et al., 2021). Diagnostic assessment is one of the typical assessments, an independent curriculum (Ami, 2018; Susanto, 2019). In the independent curriculum, diagnostic assessment is defined as an assessment carried out specifically to identify students' competencies, strengths and weaknesses so that learning can be designed according to students' competencies and conditions (Asrial et al., 2020; Azis & Lubis, 2021; Vaganova, 2023). The results of diagnostic assessments can be used by educators as a basis (entry out) in planning learning activities according to student characteristics and needs. Under certain conditions, information about family background, school readiness, learning motivation, and student interests can be taken into consideration in planning learning (Adnan et al., 2023; Triwahyuningtyas et al., 2019). Diagnostic assessments are divided into two, namely cognitive and non-cognitive assessments. However, there are still many teachers who do not carry out diagnostic assessments, especially at the beginning of learning, even though with diagnostic assessments at the beginning of learning teachers can diagnose learning styles, student interests, students' social emotional conditions and students' social emotional conditions. the extent to which students understand the material provided to continue the material. Some schools still use manual assessments or still use paper, which of course does not attract student interest. With technological developments, assessments can be carried out electronically using websites or applications that can support the assessment process which is usually called e-assessment.

E-assessment means the use of technology to manage and provide diagnostic, summative, and formative assessments. The independent curriculum definitely prioritizes the diagnostic assessment process on cognitive and non-cognitive aspects (Aryani et al., 2023; Burton, 2019). E-assessment provides its own benefits in supporting the learning process. The existence of this digital-based assessment system will support the assessment of student character in the learning process. Character assessment using e-assessment will really help teachers overcome waste of paper, save time, overcome large costs and make students focus more on filling in character. Then e-assessment can process data and provide real-time feedback so that there is direct interaction between students and teachers (Biasutti et al., 2021; Rahmawati, 2017). Thus, the application of e-assessment digitalization technology can be said to minimize teacher time in carrying out assessments because it is not done manually. Furthermore, the data that has been obtained will be saved automatically so that teachers do not need to worry if their students' grades are lost. By using this Android-based e-assessment, teachers can provide assessments with games so that they can attract students' interest in the assessments given by the teacher.

Interest in learning is the main supporter of the student learning process. Interest in learning is in line with a person's progress. Students' interest in the subject is very low, because they think mathematics is very difficult to understand. Factors that cause interest in mathematics are good teaching and enjoyment of the subject. Other influencing factors include boring teachers, students' failure to solve math problems, failure to understand the material and students not liking mathematics (Dermawati et al., 2023; Sufyadi et al., 2021; Syaifuddin et al., 2018). There are several types of attitudes that students show when receiving assignments or mathematics questions from teachers. Most students cannot and are not interested in doing the questions given and other students will do it if they understand it. Learning mathematics in elementary schools, especially fractions, often experiences learning difficulties. One of the reasons is that currently many children still learn using notebooks and blackboards, making mathematics learning less popular (Nurhasanah et al., 2019; Rahmat, 2020). To attract more student interest, mathematics learning materials can be designed using electronic media. There are many learning media that utilize technology such as e-learning, Google Site, Google Classroom, Zoom Meeting and many more. However, this media is classified as learning media which is used by many people and also does not provide educational games. One digital platform that has components that support teaching processes and activities is the Nearpod application (Hakim & Windayana, 2020; Oktafiani & Mujazi, 2019). The reason is, this platform is quite complete, supported by innovative and educational features. Starting from videos supporting learning material, questions to explanations of the material. Educators will be greatly helped by this platform, especially with the needs of the current generation who are very dependent on technology (Hakami, 2022; Herzamzam, 2020).

The nearpod application is a web-based application that serves and controls interactions during learning settings. One specific use of the nearpod application is to support students' active learning in class

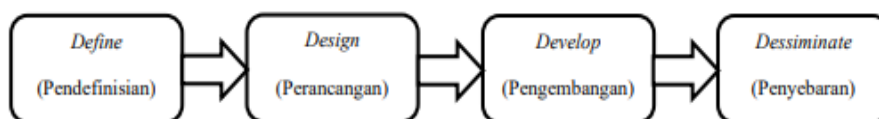
during teaching and learning sessions with various features provided to engage students in class. Nearpod is an Android and web-based application that makes the learning environment more effective. Learning is carried out on the nearpod application which can be filled with material, quizzes, learning videos and answering questions with existing game features. Nearpod has the ability to support various learning activities, both synchronous and asynchronous, and provides various features that teachers can use to monitor student learning processes in real time (Diartha et al., 2020; Himmah & Yaqin, 2019). Implementing interactive learning using nearpod is an effort to increase students' interest in learning. The nearpod platform is also effective in increasing students' interest in learning. This is because the nearpod platform provides many facilities for educators to be able to present more interesting learning. Effective media such as the nearpod platform can improve students' critical thinking skills (Laulita et al., 2020; Li & Zhao, 2023). The interactive features provided by nearpod, such as collaborative boards, videos, blanks, open questions, and images, can help teachers provide material interactively and enable dialogue that is not only limited to text and video. In the report menu, nearpod provides real-time student work reports which show the percentage of student activity during learning, and these reports can be downloaded in PDF format and shared with students (Mattar, 2019; Nur Budiono & Hatip, 2022).

The results of previous research show that the use of assessment for learning (AFL) can improve the quality of learning and mathematics learning outcomes in elementary schools. The use of assessments for learning can also enable students to learn by utilizing technology and students get feedback from the teacher directly from the technology used so that teachers no longer need to correct students' answers one (Mazana et al., 2019; Munastiwi, 2023). The skills assessment carried out by teachers during the Covid-19 pandemic was carried out via the Whatsapp and Zoom platforms by means of students sending proof of assignment results by recording or photographing them, but teachers provided feedback to their students by reporting in the assessment via semester report cards so that students could not find out the value obtained ("Assesmen Dalam Kurikulum Merdeka Belajar," 2023; Yusron & Sudiyatno, 2019). Previous research findings help create a conducive learning environment and focus students' attention on learning with limited interaction systems in the learning environment. This research was conducted in class 1 of SMA (Nur et al., 2022; Supriyadi et al., 2023). Nearpod. In terms of time efficiency, e-assessment is faster in processing grades. Students can quickly find out the scores they get after taking the test. Punctuality is also maintained. If the specified time exceeds, the questions can no longer be accessed. Apart from that, for self-assessment the results are obtained quickly. Based on several studies, there has been no research that has developed e-assessment diagnostics using the nearpod application, especially in elementary school level mathematics subjects. The use of technology really needs to be implemented, especially in the field of education, especially in the assessment system for students. In reality, there are still many teachers who do not utilize technology in the classroom assessment process, there are still many teachers who assess student learning outcomes manually so that they are less effective and efficient, sometimes teaching time is limited because of the manual assessment process.

The novelty of this research lies in the application of a diagnostic e-assessment based on the Nearpod application as a tool to increase interest in learning mathematics in grade 4 elementary school students. In contrast to traditional assessment methods which are static and carried out manually, Nearpod-based e-assessment offers a more dynamic, interactive and real-time approach. With features such as polls, interactive quizzes, simulations, and multimedia-based presentations, this application allows students to be actively involved in the learning process. Another novelty is the use of real-time diagnostic data, where teachers can identify students' weaknesses and strengths instantly, thereby providing more precise and personalized interventions. This is different from conventional assessment methods which tend to be retrospective and require longer time for results analysis. Therefore, the researcher conducted this research, apart from aiming to find out or diagnose the initial process of student learning, of course it can make it easier for teachers to carry out assessments because they receive direct feedback and grades can be seen after students complete the assessments that have been given.

## 2. METHOD

This research uses the Research and Development (R&D) method which refers to the Thiagarajan and Sammel research and development model. The collaboration between the Thiagarajan model and e-assessment is considered very suitable because it can improve the quality of learning in a valid, effective and practical way. The development model that will be planned in this research is a 4-D model (four D model) which consists of four stages, namely the definition stage, design stage, development stage, and dissemination. stage (descending). *Thiagarajan and Sammel's 4D Research and Development Model* presented in Figure 1.



**Figure 1.** Thiagarajan and Sammel’s 4D Research and Development Model (Dermawati et al., 2019)

The first stage in developing this diagnostic E-Assessment includes defining teaching and learning needs in schools through needs analysis, student analysis, task analysis, concept analysis and learning objectives. The first stage aims to define what is needed during the learning process. This was obtained through interviews with the homeroom teacher and 4th grade elementary school students. The second stage, namely planning, includes preparing assessment instruments, selecting applications, selecting product formats and creating initial designs. At this stage the aim is to prepare an initial design of the product to be developed which will later be validated at the next stage. The third stage is development, at this stage the aim is to create a diagnostic e-assessment product that has been validated by material experts and media experts. The final stage is the dissemination stage, at this stage the product is tested on students to find out how practical and effective the use of e-assessment diagnostics is in classroom learning.

The population is the entire research object, while the sample is a part of the population. The population in this study were educational institutions in Malang district, while the research sample was 4th grade elementary school students at a school. The small-scale trial research sample was taken as many as 5 children and the large-scale trial was taken as many as 21 children. The population and samples taken from this research are based on schools that have implemented an independent curriculum. This aims to ensure that the research carried out is right on target in accordance with the curriculum implemented in the school. Data collection techniques in development research include interviews and filling out surveys and assessment instruments. This interview was conducted with 4th grade elementary school teachers and students to conclude the definition stage which includes analysis of student needs, task analysis, concept analysis and learning objectives. Meanwhile, filling out surveys or assessment instruments is given to experts and students to carry out the development trial stage. The development trials that will be carried out in this research consist of two trials, namely a small-scale trial and a large-scale trial. The instruments in this research were divided into three, namely material expert validation instruments, media experts and teacher and student response questionnaire instruments. Instructions for filling in are by ticking the column that corresponds to the answer chosen, on a scale of 1 to 4. Validation instruments for material experts, media experts and teacher response instruments are presented in [Table 1](#), [Table 2](#), and [Table 3](#).

**Table 1.** Material Expert Validation

No.	Aspect	Grain
1	Content Suitability	Conformity between material and learning outcomes with learning objectives
2	Validity	e-assessment on products is easy for students to understand
3		e-assessment on products can increase students' interest in learning
4		The language used is easy for students to understand
5		The sentences used in the e-assessment are easy to understand
6	Presentation	Conformity with good and correct Indonesian language rules
7		e-assessment in product learning according to the material, namely the concept of fractions
8		e-assessment can be accessed both online and offline, making it easier for teachers to assign assignments.
9	Learn to be Independent	Students can play while learning
10		E-assessment of fraction concept material can help students learn independently anywhere and anytime using a smartphone.

**Table 2. Media Expert Validation**

No.	Aspect	Grain
1	Product Design	Choose the appropriate background
2		Product attractiveness
3		Practicality of using teaching materials
4		Clarity of language use
5	Product Content Design	Suitability of product material with learning objectives
6		The use of letter variations is not excessive
7		Match the pictures with the questions.
8		Space between lines of text in plain text
9		Attractive appearance of the product
10	Audio	Clarity of narration in the video

**Table 3. Teacher and Student Response Quiz**

No.	Grain
1	Clarity of e-assessment development products.
2	Clarity of questions in e-assessment
3	Clarity of instructions for completing the e-assessment
4	Accuracy of questions with expected answers
5	Questions related to learning objectives
6	Questions according to the aspects you want to achieve
7	A statement contains a complete idea
8	The language used is easy to understand
9	The language used is effective
10	Writing according to EYD

After carrying out a validation test to see the feasibility and practicality of the product that has been researched, it is then continued with a product trial to find out to what extent this product can increase students' interest in learning mathematics. After that, to find out student learning outcomes, a comparison of pretest and posttest scores was carried out using N-Gain calculations. Once completed, the researcher then analyzed the theory that had been studied and reduced it to an indicator of interest in learning mathematics.

### 3. RESULT AND DISCUSSION

#### Result

##### Validation Test

This validation test is used to see the level of suitability or perfection of an instrument product. An instrument that has high validation is declared suitable or very good when used. The validation test in this study is declared valid if it obtains a minimum score of 61%. The first validation is carried out by material experts. The instrument was validated before use. The instrument used for product validation consists of 10 items with a score range of 1 to 4. The results of the material expert validation are presented in [Table 4](#).

**Table 4. Material Expert Validation Results**

Aspect	Maximum Total Score	Score Obtained	Percentage
Content Eligibility	12	12	100%
Linguistic Qualifications	12	9	75%
Presentation	12	12	100%
Learn to be Independent	4	4	100%
<b>Total</b>	<b>40</b>	<b>37</b>	<b>92.5 %</b>

Based on [Table 4](#), the results of the material expert recapitulation of the Nearpod Application-Based Diagnostic E-Assessment Assessment of interest in learning mathematics for grade 4 elementary school students obtained an average score of 92.5% so it is included in the very good category. category. The second validation was carried out by media experts. The instrument was validated before use. The instrument used for product validation consists of 10 items with a score range of 1 to 4. The results of the material expert validation are presented in [Table 5](#).

**Table 5. Media Expert Validation Results**

Aspect	Maximum Total Score	Score Obtained	Percentage
Product Design	16	15	93,75%
Product Content Design	20	19	95%
Audio	4	4	100%
<b>Total</b>	<b>40</b>	<b>38</b>	<b>95%</b>

Based on Table 5, the results of the recapitulation of Diagnostic E-Assessment media experts based on the Nearpod Application on the interest in learning mathematics in grade 4 elementary school students obtained an average score of 95% so it is included in the very good category. Next are the results of product assessments by teachers and students. This product assessment by teachers and students was carried out by one of the driving teachers and 4th grade elementary school students. In the analysis of product assessment data by teachers and students. The diagnostic e-assessment instrument consists of 10 questions with a score range of 1 to 4. The instrument has been validated before use. The results of the teacher and student response questionnaire can be presented in Table 6.

**Table 6. Results of Teacher and Student Response Questionnaires**

Aspect	Maximum Total Score	Score obtained	Percentage
Teacher	40	36	90%
Student	40	38	95%
<b>Total</b>	<b>40</b>	<b>37</b>	<b>92.5 %</b>

Based on Table 6, the results of the teacher and student recapitulation of the product developed, it is known that the teacher and student assessment of the nearpod application-based diagnostic e-assessment product obtained an average score of 92.5%, this average is included in the very good category, So it can be said that all aspects of the product developed have met the requirements for assessment. Before testing the product, researchers first explained the Diagnostic e-assessment to students. After explaining, the researcher tried one of the activities in the e-assessment diagnostic, respondents were asked to fill out questions or assessments. The assessment contains two categories, namely cognitive and non-cognitive diagnostic assessments. The cognitive diagnostic assessment consists of 3 categories of questions, namely 10 multiple choice, 5 true-false, and 5 essays. Based on the assessment carried out by 5 respondents, the recapitulation results obtained are presented in Table 7.

**Table 7. Recapitulation of Limited Track Results**

No.	Respondent	Category			%
		Multiple Choice	True False	Essay	
1	GFS	80	80	80	80%
2	TN	60	60	60	60%
3	AND	60	80	80	74%
4	SPM	80	60	100	80%
5	ZPF	60	80	80	73.33%
	<b>Average</b>	<b>68</b>	<b>72</b>	<b>80</b>	<b>73.33%</b>

After recapitulating the results of the small-scale trial analysis, the quality of the diagnostic e-assessment product according to five respondents with varying skills obtained an average score of 73.33% in the good category, which means that diagnostic e-assessment can be used with slight revisions to the application operating system. nearpod. The next development test with respondents was 21 students according to the number of students in grade 4 elementary school. Before the diagnostic e-assessment product was tested, researchers conducted a pretest on the learning material that had been packaged in the product being developed. The purpose of this pretest is to determine students' initial abilities before carrying out an assessment using the nearpod application. Researchers will compare the results with the results after conducting an assessment using the nearpod application. The pretest that researchers carried out on students was where students carried out assessments using paper, while the posttest was carried out using smartphones via the nearpod application. This comprehensive trial was carried out in class like the previous small-scale trial. The questions on the pretest and posttest include cognitive diagnostic assessments, while non-cognitive diagnostic assessments will contain statements about students' activities during learning and their difficulties which can then be followed up by the teacher. In this section,

respondents will assess the products made at the design stage. Next, researchers will directly review the process of using diagnostic e-assessment. After carrying out the pretest and posttest, the next stage is analyzing the data using the Gain Score (N-Gain) technique. From the results of data analysis using the N-Gain technique.

From the results of calculations using N-Gain, the gain index value for each student and the criteria for student effectiveness are obtained from the results of the student's pretest and posttest scores. From this data, there is an increase in student learning outcomes scores between pretest and posttest scores. For the average gain index for all students, a score of 0.75 was obtained, this figure is based on the gain score classification table, including high criteria. So it can be concluded that in this comprehensive trial the effectiveness of the product developed in the learning process based on the results of the pretest and posttest scores fell within the "HIGH" effectiveness criteria.

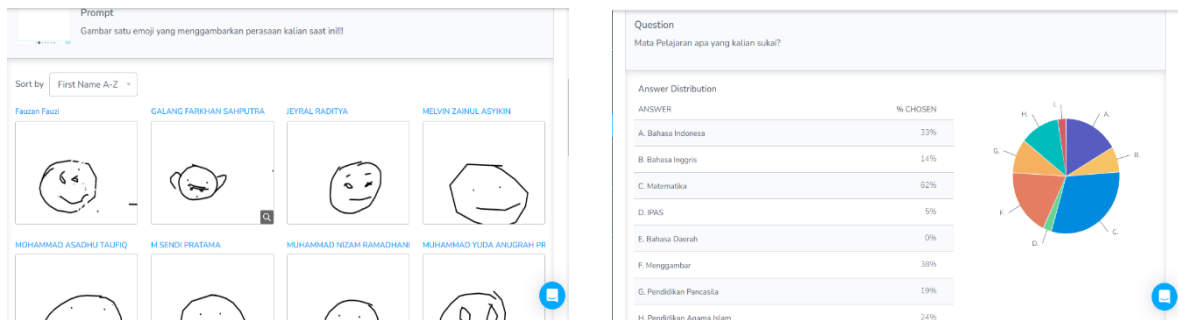


Figure 2. Display of non-Cognitive Diagnostic Assessment Results in the Nearpod Application

Next, an analysis of the results of the non-cognitive diagnostic assessment was carried out. The results of this non-cognitive diagnostic assessment are used as a benchmark for students' emotional conditions, student weaknesses and learning difficulties experienced by students during the mathematics learning process. Based on Figure 2, there are students who have different emotional conditions, there are students who describe facial expressions through smiles, frowns and other emoticons. In the next image there is a pie chart which states that 62% of students like mathematics lessons, especially using the nearpod application. This can be used as a benchmark for teachers in determining assessments that make students enjoy learning. This states that students in good psychological condition will definitely be ready to accept learning. Meanwhile, students who are still below average will be assisted by the homeroom teacher and supervising teacher to explore student problems or obstacles. Here the role of the teacher in overcoming this is by carrying out follow-up where the teacher can discuss directly with students about the reasons they depict emoticons like that, whether they are experiencing problems either at school or outside the home so that learning seems less enthusiastic. This can hinder students from learning in class, because they do not focus on learning activities.

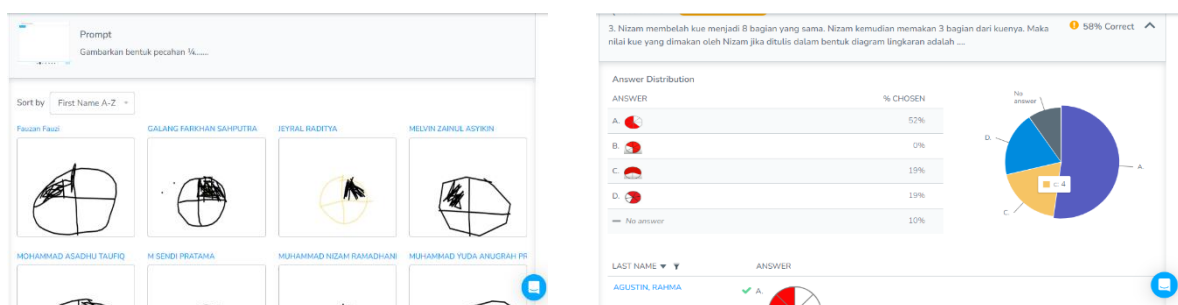


Figure 3. Display of Cognitive Diagnostic Assessment Results in the Nearpod Application

In Figure 3. The following are the results of students' answers to the cognitive diagnostic assessment on essay questions. Based on Figure 3, 81% of students can determine the location of the denominator and numerator of a fraction. In the next picture there is a change in story problems into mathematical form, where students sometimes have difficulty changing story problems into mathematical form. There were 52% of students who answered correctly, 38% of students answered incorrectly, and 10% of students did not answer. Students sometimes experience difficulty in changing problem sentences into mathematical models or vice versa. In the next picture students can draw fractions well. When carrying out

this cognitive diagnostic assessment they were very enthusiastic about drawing, as seen from the results of their answers which made the picture as attractive as possible by using color combinations in the picture.

**Table 8. Results of Student Response Questionnaires**

Aspect	Maximum Total Score	Score obtained	Percentage
Content Eligibility	12	11	91.6%
Presentation	16	15	93.75%
Language	12	11	91.6%
<b>Total</b>	<b>40</b>	<b>37</b>	<b>92.31 %</b>

Before conducting product socialization, researchers distributed product usage response questionnaires to students to find out how feasible the Nearpod application-based diagnostic e-assessment product was for the interest in learning mathematics for grade 4 elementary school students that had been developed. From the results of the questionnaire given to students, they obtained an average score of 92.31% in the very good category. In this study, the socialization of diagnostic e-assessment was limited to that of being given to 4th grade elementary school teachers. The results of this research are in line with research conducted by Dermawati et al. (2019) with details of the average class score at the pre-graduate stage of 36.88 with a classical completion level of 28.13%, which is included in the poor category. Then in cycle I it increased to 70.63 with a classical completion level of 56.25% in the sufficient category. Furthermore, in cycle II it increased to 89.38 with a classical completion level of 87.5%, included in the very good category. The results obtained are in line with research conducted (Hakim & Windayana, 2016) which states that learning mathematics using interactive multimedia has a significant effect on improving the learning outcomes of grade 5 students at SDIT Qordova, Rancaekek District, Bandung Regency. Based on the research results, the average score in the experimental class was 7.833, while the average score in the conversion class was 6.333. This proves that the use of interactive multimedia is very influential in improving student learning outcomes.

**Discussion**

An independent curriculum is a curriculum with learning in a diverse curriculum that optimizes content so that students have enough time to explore concepts and develop their abilities. Teachers have the freedom to choose various educational tools to adapt their learning to their students' learning needs and interests (Muliza Putri & Amini, 2022; Nasution, 2023; Susanto, 2019). According to previous research, independent learning is an idea to improve an education system that seems monotonous. Independent learning is expected to create a pleasant, cool and happy atmosphere. The concept of independent learning goes back to the essence of the law which gives school principals the freedom to interpret the basic competencies of the curriculum into school assessments (Ambarwati et al., 2019; "Assesmen Dalam Kurikulum Merdeka Belajar," 2023).

According to previous research, teachers should carry out diagnostic assessments before learning begins, especially in independent curricula. This is because if learning is not in accordance with students' abilities, it will have an impact on the learning process not being optimal (Dermawati et al., 2023; Rahmawati, 2017). Therefore, it is necessary to study how diagnostic assessments as learning assessments in the independent curriculum in elementary schools can run according to the expected goals (Achmad Efendi et al., 2022; Ambarwati et al., 2019). In the independent curriculum there is a diagnostic assessment which is usually carried out at the beginning of learning. By knowing students' initial conditions, both cognitive and non-cognitive, it is hoped that teachers can carry out learning no longer based on the achievements of the majority of students in their class, but teachers are expected to be able to facilitate learning according to students' initial conditions. with the initial conditions of each student ("Assesmen Dalam Kurikulum Merdeka Belajar," 2023; Triwahyuningtyas et al., 2019).

The results of previous research show that teachers' responses to the developed cognitive e-assessment were very good, as seen from the teacher's response to cognitive e-assessments reaching 78.6% (Aryani et al., 2023; Hakim & Windayana, 2020). Meanwhile, similar research using Kahoot media also received a good response because in its implementation teachers no longer assess student learning outcomes manually but rather student learning outcomes can be seen directly from the application (Azis & Lubis, 2021; Triwahyuningtyas et al., 2019). From several previous studies, it turns out that the use of e-assessment really makes it easier for teachers in the learning process in the classroom, especially in the process of assessing student learning outcomes, which can make teachers more effective and efficient in terms of time.

Problems encountered when learning to use the nearpod application include; First, the only language used is English, making it difficult and hindering for teachers who have minimal English skills.



Second, internet data usage is quite wasteful because this media displays videos, images and other features that use up a lot of internet data. Third, in making models or media, teachers cannot use cellphones, they can only make them on laptops or PC computers, so they are less practical and flexible (Hakami, 2022; Nur Budiono & Hatip, 2022). The disadvantage of the nearpod application is that using the nearpod application requires quite wasteful use of internet data. It must be supported by a strong signal so that it is less effective if applied in areas where the signal does not support it and does not reach rural areas. Teachers can only create learning modules via computer.

This research has significant implications in managing mathematics learning at the elementary school (SD) level, especially in increasing the interest in learning of grade 4 students. Practically, the results of this research can encourage teachers to adopt more interactive and data-based learning technology, where the Nearpod application allows teachers to provide real-time feedback and monitor individual student learning difficulties. Through interactive features such as quizzes, videos, and collaborative activities, Nearpod creates a more engaging learning environment and encourages active student participation. This implication is relevant in the context of technology-based learning (edtech), where the learning process is no longer one-way, but is more participatory and based on student involvement. Theoretically, this research strengthens the literature regarding the influence of e-assessment-based learning technology on students' learning interest and motivation. By providing more accurate diagnostic data, teachers can design learning interventions that better suit students' needs, especially for those who have difficulty understanding mathematical concepts. From a policy perspective, the implications of this research can encourage schools and the government to integrate e-assessment-based learning applications into formal learning systems. Policy support in terms of teacher training and provision of technological infrastructure is also needed so that the implementation of the Nearpod application can run more effectively. Thus, it is hoped that the findings of this research will be able to make an important contribution to improving the quality of mathematics learning in elementary schools and encouraging a more innovative, adaptive and technology-based learning transformation.

This study has several limitations that need to be considered in its interpretation. One of the main limitations is dependence on adequate technological infrastructure, such as computer or tablet devices and a stable internet connection. In some areas or schools, limited access to technological devices can hinder the effectiveness of implementing Nearpod-based e-assessment. Additionally, although the app is designed for engaging interaction, variations in students' technology skill levels may impact their active participation in learning. Another limitation is the nature of the research which focused on 4th grade elementary school students, so the results may not be directly generalizable to other levels of education or larger age groups. This research also tends to rely on quantitative data from e-assessments, which may not fully describe the more complex dynamics of students' learning interests and motivation.

To overcome these limitations, it is recommended that further research expand the sample scope by involving various schools that have various technological conditions, in order to test the effectiveness of the Nearpod application in various situations. Apart from that, more in-depth research needs to be conducted to explore other factors that influence interest in learning, such as the role of parents and students' social environment. Further research could also incorporate qualitative methods, such as interviews or observations, to gain a more comprehensive understanding of the impact of technology use on students' learning interest and motivation. As a policy, it is recommended that schools and the government provide technology training to teachers and improve technology infrastructure in schools to support more effective implementation of e-assessment. By paying attention to these limitations, it is hoped that the application of the Nearpod application can be more optimal and provide greater benefits in improving the quality of mathematics learning in elementary schools.

#### 4. CONCLUSION

Diagnostic assessment is an assessment carried out to diagnose students' abilities, strengths and weaknesses so that learning in class becomes more enjoyable. In their assessments, teachers can utilize existing technology so that students become more interested in learning. With technology, assessments can be done electronically using websites or applications available on the internet or in the Play Store such as the Nearpod application. The use of assessments that utilize technology is usually called electronic assessment (e-assessment).

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