

DEVELOPMENT OF DIGITAL-BASED DIAGNOSTIC TESTS AS A TRIGGER FOR DIFFERENTIATED LEARNING IN THE IMPLEMENTATION OF THE INDEPENDENT CURRICULUM

Ahmad Habibi, Sri Subarinah, A.A. Sukarso, Muh. Makhrus, Ida Ermiana

Universitas Mataram, Kota Mataram Nusa Tenggara Barat

Email: abyganteng29@gmail.com, srisubarinah.fkip@unram.ac.id, asukarso@unram.ac.id,
makhrus.muh@unram.ac.id, ida_ermiana@unram.ac.id

Received: 11/06/2026 | Revised : 20/06/2026 | Accepted: 10/07/2026 | Published :16/07/2026

Abstract

This study aims to develop a valid, practical, and effective digital-based diagnostic test to support differentiated learning in the Independent Curriculum. The method used was Research and Development (R&D) through stages of development, expert validation, limited trials, and large-scale trials. The results showed that the digital diagnostic test has a very high level of validity based on expert assessments of content, construction, and language aspects. In terms of practicality, teacher responses were in the very good category with a percentage of 89.38%, indicating that the instrument is easy to use and can accelerate the assessment process and result processing. In terms of effectiveness, there was an increase in student learning outcomes, indicated by an increase in the average score from 82.29 to 89.90. In addition, the test was able to identify student learning readiness as a basis for designing differentiated learning. Thus, the digital-based diagnostic test was declared valid, practical, and effective in improving the quality of learning and student learning outcomes.

Keywords: *digital diagnostic tests, differentiated learning, Independent Curriculum, validity, practicality, effectiveness*

INTRODUCTION

The Independent Curriculum is a curriculum approach that emphasizes more independent, flexible, and relevant learning in line with current societal and technological developments (Indarta et al., 2022). The Independent Curriculum is a programming concept aimed at giving teachers freedom in designing learning and flexibility in learning methods and materials (Efendi et al., 2023). RThis concept aligns teaching with students' needs and interests, with the goal of creating more relevant and effective learning.

The Independent Curriculum provides more space for students to explore their interests and potential, as well as develop skills needed in the real world. In other words, the Independent Curriculum emphasizes differentiated learning tailored to the needs, interests, and abilities of each student (Islam et al., 2023). However, implementing the Independent Curriculum is no easy task. One of the main challenges in implementing this curriculum is ensuring that each student receives learning tailored to their needs. In this regard, diagnostic tests play a crucial role in early diagnosis of student learning needs.

Diagnostic tests are tools used to identify students' levels of understanding and abilities in various subjects (Mutmainna et al., 2018). By using diagnostic tests, teachers can gain a deeper understanding of each student's strengths and weaknesses (Riyan Afandi et al., 2022), allowing the results to serve as a basis for providing appropriate follow-up treatment tailored to the student's weaknesses (Abarca, 2021). In today's digital era, the use of technology in education is crucial because students are familiar with and even able to use technology effectively, such as gadgets. Therefore, the development of digital diagnostic tests is increasingly relevant. Digital diagnostic tests can provide flexibility in measurement and data collection, as well as enable faster feedback to students and teachers (Afandi et al., 2022).

Previous research has shown that diagnostic tests are the first step in helping students maximize their development. However, not all students achieve maximum progress in their learning. Students often face difficulties or problems and require assistance and support from their environment to resolve them. To effectively assist students, it is necessary to first identify the difficulties or problems they are facing, then analyze them and formulate solutions. For this purpose, diagnostic tests are needed (Nasional et al., 2007). Based on students' responses to two-level multiple-choice diagnostic tests, it can be concluded that this test instrument is quite effective in identifying students' level of understanding of mathematical concepts (Mutmainna et al., 2018).

Field findings indicate that teachers have not conducted diagnostic tests before lessons. A survey showed that 72.22% of teachers at SDN 07 Mataram had not conducted diagnostic tests. Consequently, they have not mapped students' learning needs based on their readiness, interests, and learning profiles. Diagnostic tests are the initial step in helping students maximize their development (Prasetyaningrum et al., 2022). This research aims to examine and develop a digital diagnostic test that can stimulate differentiated learning in the implementation of the Independent Curriculum. This research will focus on several aspects, including test instrument development, test validity and reliability, and the implementation of digital diagnostic tests in everyday learning processes.

Differentiated education is an approach that enables teachers to understand students' needs and abilities and design learning to accommodate these differences (Efendi et al., 2023). In the context of the independent curriculum, differentiated learning becomes even more important because teachers must adapt learning to students' varying levels of readiness, interests, and learning styles. Through diversity, every student has an equal opportunity to reach their potential (Bisri, MohFitriyah, 2023).

Advances in digital technology have opened up new opportunities in education. In the digital age, exams are no longer limited to pen and paper. The development of digital assessment tests can provide significant flexibility in data collection and student performance. Furthermore, digital assessment tests can provide real-time results, enabling teachers to respond quickly to student needs. This research seeks to develop effective and relevant digital assessment tests to support diverse learning and the implementation of the Merdeka program. It is hoped that this research will provide useful advice and information on how to integrate digital assessments into various learning environments.

This has significant implications for improving the quality of education in Indonesia and encouraging innovation in education. The formulation of the problem includes: First, how is the development of a digital-based diagnostic test capable of triggering differentiated learning in the implementation of the Independent Curriculum in elementary schools? Second, what is the level of feasibility of the developed digital-based diagnostic test in terms of its validity and reliability as a supporting instrument for differentiated learning? Third, how effective is the use of digital-based diagnostic tests in helping teachers identify and map students' learning needs based on their learning readiness, interests, and learning profiles in the implementation of the Independent Curriculum?

The objectives of this research include: first, producing a digital-based diagnostic test that can be used as a catalyst for differentiated learning in the implementation of the Independent Curriculum in elementary schools. Second, analyzing the feasibility of the digital-based diagnostic test developed based on validity and reliability as a differentiated learning instrument. Third, describing the effectiveness of using digital-based diagnostic tests in helping teachers identify and map student learning needs based on learning readiness, interests, and learning profiles in the implementation of the Independent Curriculum.

LITERATURE REVIEW

Diagnostic tests are assessment instruments used to identify initial abilities, learning difficulties, and factors influencing student achievement. Unlike summative assessments, which focus on final learning outcomes, diagnostic tests serve to obtain in-depth information about students' learning conditions so that teachers can design follow-up actions tailored to individual student needs. According to the Ministry of National Education (2007), the primary function of diagnostic tests is to identify student learning difficulties and plan appropriate interventions based on the results of this identification.

Advances in information technology have driven the transformation of conventional assessments toward digital-based ones. Digital diagnostic tests enable faster, more efficient, and more accurate data collection, processing, and analysis. Furthermore, utilizing digital platforms can help teachers obtain real-time student learning information, thereby enabling more responsive instructional decision-making. Within the context of the Independent Curriculum, digital diagnostic tests play a strategic role because they support the implementation of student-centered learning. Diagnostic test indicators include identifying students' prior knowledge, analyzing learning difficulties, determining the causes of learning errors, measuring the achievement of learning objectives, identifying individual differences in material mastery, and measuring critical thinking skills. These characteristics indicate that diagnostic tests serve not only as an evaluation tool but also as a basis for more adaptive learning planning that is oriented towards student needs.

Differentiated learning is a learning approach that provides students with opportunities to learn according to their individual readiness, interests, and learning profiles. Suwartiningsih (2021) explains that differentiated learning requires teachers to make pedagogical decisions oriented to student needs, including the selection of strategies, learning resources, media, and assessment methods. The primary foundation of differentiated learning is recognition of the diverse characteristics of students. Tomlinson (2001) emphasized that each student has different potential, experiences, and learning needs, so the learning process must be designed flexibly to accommodate these differences. Therefore, teachers need to understand students' initial conditions before determining which learning strategies to implement.

Differentiated learning can be implemented through three main strategies: content differentiation, process differentiation, and product differentiation. Content differentiation relates to the material students learn, process differentiation relates to how students understand the material, and product differentiation relates to the form of learning outcomes students produce. All three strategies require accurate data on student characteristics, making the use of diagnostic tests crucial as a basis for learning decision-making. The Independent Curriculum (Curriculum Merdeka) is a government effort to create a more flexible, adaptive, and student-centered education system. The main concept of the Independent Curriculum is to provide teachers and schools with the flexibility to design learning tailored to student needs. This approach emphasizes competency development, contextual learning, the use of technology, and strengthening student character.

According to Indarta et al. (2022), the Independent Curriculum is designed to address 21st-century challenges that demand critical thinking, creativity, communication, collaboration, and digital literacy. To achieve these goals, teachers need accurate information about students' initial conditions so that the learning process can be tailored to their abilities and needs. In its implementation, diagnostic assessment is a crucial component of the Independent Curriculum. The results of the diagnostic assessment are used as the basis for developing differentiated learning strategies so that each student receives learning experiences tailored to their characteristics. Thus, diagnostic assessment serves not only as a tool for identifying learning difficulties but also as a supporting instrument for the successful implementation of the Independent Curriculum.

Various studies have examined the development and use of diagnostic tests in the learning process. Duskri et al. (2014) developed a diagnostic test for mathematics learning difficulties in elementary school students and found the instrument effective in identifying students' learning difficulties in number learning. This study demonstrated the importance of diagnostic tests as a tool for identifying learning barriers, although it did not utilize digital technology in the data management process. Abarca's (2021) research used the Research and Development (R&D) method to develop a diagnostic test instrument. The results showed that the developed instrument met the criteria for validity, relevance, specificity, and efficiency. These findings reinforce the importance of developing instruments that meet quality standards to produce accurate information regarding students' learning outcomes.

Komalawati et al. (2020) highlighted the role of early diagnostic tests in identifying learning loss following home-based learning. The results showed that diagnostic assessments can help teachers identify student learning barriers early, allowing for more effective follow-up learning. Meanwhile, Rinta and Fitriza (2022) developed a diagnostic test instrument proven valid and reliable for identifying student learning difficulties. This research confirms that a quality diagnostic instrument can provide a strong basis for making learning decisions.

Although various studies have demonstrated the effectiveness of diagnostic tests in identifying learning difficulties, most research still focuses on developing conventional instruments or measuring specific academic aspects. Furthermore, the integration of digital diagnostic tests with differentiated learning needs in the context of implementing the Independent Curriculum remains relatively limited. Based on a literature review, there is a research gap regarding the development of digital-based diagnostic tests specifically designed to support differentiated learning in the Independent Curriculum. Previous research generally focused on identifying learning difficulties or validating instruments without directly integrating assessment results into differentiated learning plans. Furthermore, the use of digital technology as an assessment tool capable of producing data quickly, accurately, and easily analyzed

still requires further development. Therefore, this research seeks to develop a digital-based diagnostic test that not only identifies students' abilities and learning difficulties but also provides relevant information for teachers in designing differentiated learning in accordance with the principles of the Independent Curriculum. Thus, this research is expected to provide theoretical contributions in the development of digital diagnostic assessment studies as well as practical contributions for teachers in increasing the effectiveness of student-centered learning.

METHOD

The research method that will be used is the research and development (R&D) method. According to Sugiono (2016), Research and Development (R&D) is a method or step to create a new product or develop and refine an existing product and is used to test the effectiveness of the product.

In this research, the flow used (Sugiono, 2016) will be simplified into 6 stages of R & D. These steps are as follows: Potential and problems, Data Collection, Product Design, Validation, Revision, and Product Trial. These six stages can be seen in chart 2.1.



Figure 2.1. Stages of R & D Development Model Sugiono (2016)

The diagnostic test will be administered to 110 sixth-grade phase C students at SDN 7 Mataram. Thirty-six fifth-grade students will be selected for the preliminary trial. The study will be conducted from August to December 2025.

The data collection techniques in this study were 1) Diagnostic Tests, which were given to students. 2) Questionnaires (surveys), the questionnaires used were questionnaires for instrument experts and practicality questionnaires compiled based on the grid. 3) Interviews were conducted with teachers and students who carried out digital diagnostic tests.

The data analysis technique used by researchers to develop this digital diagnostic test refers to the quality criteria of a material proposed by Nieveen, Anisak et al. (2017), which states that a material is considered high quality if it meets product quality aspects, including validity, practicality, and effectiveness.

According to Nieveen (2018), the practicality of the material is determined by whether teachers and students can use the material easily. Based on Nieveen's definition of practicality, the digital diagnostic test developed by the researcher is considered practical if the validators state that the developed digital diagnostic test can be used in the field with minimal or no revisions that have been filled out on the digital diagnostic test validation sheet. The measurement of the level of practicality will be carried out using the formula obtained from Rahmat and Irfan (2019) as follows:

$$\text{Nilai Kepraktisan} = \frac{\text{skor yang diperoleh}}{\text{skor maksimal}} \times 100\%(1)$$

Practicality Value Scale Table	
Achievement Level	Criteria
80 < P ≤100	Very Practical
60 < P ≤80	Practical
40 < P ≤60	Quite Practical
20 < P ≤40	Impractical
P ≤20	Very Impractical

To test the effectiveness of digital diagnostic tests based on student test results with the assessment reference in table 3.4 (Yamasari, 2010).

Percentage of effectiveness	
Percentage of student responses (R)	Category
85% ≤ R < 100%	Very Positive
70% ≤ R < 85%	Positive
50% ≤ R < 70%	Less Positive
0% ≤ R < 50%	Not Positive

RESULTS AND DISCUSSION

This research is a research and development (R&D) project aimed at producing a digital-based diagnostic test as an instrument for identifying students' initial abilities, learning needs, and characteristics. The development of this instrument was motivated by the low results of sixth-grade students' formative assessments on comparing and ordering fractions, with an average score of 6.45, and on adding and subtracting fractions, with an average score of 6.75. These conditions indicate the need for an instrument capable of more accurately mapping students' learning difficulties as a basis for implementing differentiated learning in the Independent Curriculum.

The Independent Curriculum requires teachers to understand the diversity of student characteristics, including learning readiness, interests, and learning profiles. However, the implementation of diagnostic assessments in elementary schools still faces various challenges, particularly in the management and analysis of results, which

require relatively long periods of time. Therefore, the development of digital-based diagnostic tests is an alternative solution to support more effective, efficient, and user-friendly initial assessments for teachers.

Product development refers to Sugiyono's model, which includes six stages: potential and problems, data collection, product design, design validation, design revision, and product testing. During the potential and problems identification stage, it was discovered that teachers still experienced difficulties in optimally implementing diagnostic assessments. Next, data collection was conducted through literature studies, observations, and interviews to obtain information regarding user needs. This data served as the basis for designing digital diagnostic tests that were tailored to student characteristics and learning needs.

The developed product was then validated by experts to assess the feasibility of the material, language, and digital display. The validation results were used as the basis for product revisions, including refining the non-academic diagnostic instrument and combining LOTS (Lower Order Thinking Skills) and HOTS (Higher Order Thinking Skills) questions into the academic instrument. The final stage, a product trial, was conducted to determine the instrument's practicality and effectiveness in supporting differentiated learning.

Through systematic development stages based on empirical data, the resulting digital diagnostic test is expected to meet the criteria of validity, practicality, and effectiveness, and to be able to assist teachers in designing more adaptive learning that is centered on students' learning needs in accordance with the principles of the Independent Curriculum.

Stages of Digital Diagnostic Test Development

1. Potential Problems

The initial stage of this research began with identifying potential and challenges related to the implementation of the Independent Curriculum, which requires differentiated learning. Implementing differentiated learning requires accurate information regarding students' learning readiness, interests, and learning profiles. However, observations and interviews with teachers at SDN 7 Mataram revealed that diagnostic assessments are still conducted manually, are not standardized, and focus primarily on cognitive aspects, thus failing to provide a comprehensive picture of student characteristics.

This situation makes it difficult for teachers to map students' learning needs and develop appropriate teaching strategies. This finding aligns with a report from the Ministry of Education, Culture, Research, and Technology (2022), which shows that the use of diagnostic assessments in elementary education remains suboptimal due to limited teacher understanding, minimal training, and the lack of practical and adaptive instruments. On the other hand, advances in digital technology offer opportunities to improve assessment effectiveness through automated data processing, faster result presentation, and comprehensive visualization of student learning profiles. Therefore, this research developed a digital-based diagnostic test designed to quickly and accurately generate information on student learning readiness, interests, and learning profiles. The assessment results are expected to serve as a basis for teachers in designing more effective, differentiated learning tailored to each student's learning needs.

The data collection phase was conducted to obtain accurate information regarding user needs and the characteristics of the product to be developed. Data were collected through semi-structured interviews, questionnaires, and analysis of the Independent Curriculum document. Six classroom teachers and one principal participated as respondents.

2. Data collection

Data collection results indicate that 83.33% of teachers require a systematic and easy-to-use diagnostic instrument to identify student learning readiness. Furthermore, 77.78% of teachers expressed readiness to utilize digital platforms for assessments if they are designed practically and align with learning needs. These findings indicate a high demand for digital diagnostic tools that can help teachers quickly and accurately map students' initial conditions.

The data obtained serves as the basis for designing features, content, and working mechanisms of digital diagnostic tests to suit user needs and support the effective implementation of differentiated learning in elementary schools.

3. Product Design

In designing this product, researchers considered design principles that refer to digital learning device development standards, namely:

- 1. The suitability of content with Learning Outcomes (CP), so that the instruments used truly support the achievement of learning objectives that have been set in the Independent Curriculum.
- 2. Accessibility and ease of use, which includes readability, interface navigation, and cross-device compatibility so that it can be used in various elementary school conditions, both those with device limitations and those that are already digital-based.
- 3. Automation of results and simple analytics, which allows assessment results to be presented in real-time, accurately, and easily understood by teachers without the need for complex analysis processes.

4. Design Validation

The design validation stage is a crucial step in the educational product development process, as it aims to ensure that the resulting prototype meets quality standards in terms of content, appearance, and practical usability. This validation also provides important feedback for developers before the product is deployed more widely in field trials. In this context, validation is conducted to assess the feasibility of the designed digital diagnostic test, both in terms of subject content and the media and learning technology aspects.

The first validation step in developing this diagnostic test was the validation of a questionnaire assessing students' learning readiness for the learning process. The questionnaire was validated by two experts, one in content/materials and one in design/media. The results of the teaching materials validation are outlined in the following table:

Table of Expert Validation Results of Student Learning Readiness Questionnaire

Category	Number of Grains	Percentage/Description	Results
Very Valid	9 Grains	90%–100%	Worth using
Valid	9 Grains	80%	Decent with minor revisions
Quite Valid	1 Grain	70%	Needs revision
Invalid	1 Grain	60%	Needs improvement
Validator Score 1	—	Total score 91	Very Valid
Validator Score 2	—	Total score 85	Very Valid
Average Score	—	4.4	Very Valid
Eligibility Percentage	—	88%	Very Valid

Based on the validation results conducted by two validators (V1 and V2), a general overview was obtained that the student learning readiness questionnaire instrument has a high level of validity. Overall, the scores given by the validators reached 91 (V1) and 85 (V2) with an average score of 4.4 on a scale of 5. This value indicates that the instrument is in the "Very Valid" category, making it suitable for use in research. In general, the composition of the validation results shows that the majority of questionnaire items have met the criteria for construct validity, where only two items (numbers 4 and 19) require significant improvement. The second validation step in the development of this diagnostic test was the validation of the academic diagnostic test questions within the learning process. The validation of the academic diagnostic test questions was conducted by two experts in content/materials and design/media. The results of the teaching materials validation are outlined as follows:

Table 4.2 Expert Validation Results of Digital-Based Diagnostic Test Questions

Category	Number of Grains	Percentage/Description	Results
Very Valid	18 Grains	90%–100%	Worth using
Valid	4 Items	80%	Decent with minor revisions
Validator Score 1	—	Total score 102	Very Valid
Validator Score 2	—	Total score 103	Very Valid
Average Score	—	4.65	Very Valid
Eligibility Percentage	—	93.63%	Very Valid

The results of expert validation of the digital-based diagnostic test instrument indicate that the developed questions are of excellent quality overall. This is evidenced by the total scores obtained from two validators, namely 102 and 103, with an average score of 4.63 (Validator 1) and 4.68 (Validator 2) or an overall percentage of 93.63%. According to validity criteria, this percentage falls into the "Very Valid" category. Thus, this diagnostic test can be used as a measuring tool to identify students' readiness and learning needs to support the implementation of differentiated learning in the Independent Curriculum. The third validation step in developing this digital-based diagnostic test was validating the teacher and student response questionnaires. The questionnaire validation was conducted by two content experts. The validation results are outlined as follows:

Table 4.3 Results of Validation of Teacher and Student Responses

No	Description	Results
1	Number of aspects assessed	10 aspects
2	Validation category	Very Valid
3	Validator Score 1	45
4	Validator Score 2	44
5	Average score	4.45
6	Eligibility percentage	89%
7	Information	Worth using

The validation results show that the teacher and student response questionnaires are of very good quality (average 89% = Very Valid). This instrument has met the aspects of efficiency, ease of use, content relevance, readability, and usability of the results. Thus, the questionnaire is suitable for use in collecting data on user responses to digital-based diagnostic tests. However, researchers are advised to make improvements in the aspects of readability, objectivity, and usability of the results to optimize the instrument in providing a realistic picture of respondents' experiences and perceptions.

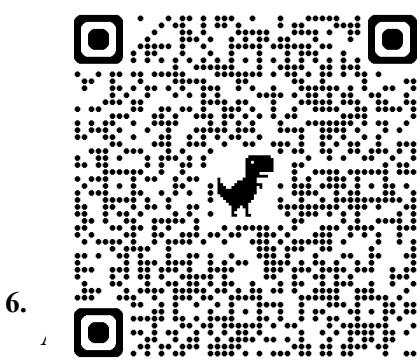
5. Design Revision

Revisions were made based on suggestions from validators, including:

- a. Added “user manual” feature on the home page
- b. Language adjustments to be more communicative
- c. Compilation of questions based on cognitive levels (LOTs and HOTs)
- d. Improved output results to be more visual and interpretive

Revisions were carried out iteratively while maintaining the essence of the initial design. The results of the revisions can be seen in the following barcode:

Initial Design



Revised Results



6. trials in the form of diagnostic test applications for both academic and non-academic subjects include learning readiness tests, academic ability tests, and teacher and student responses.

Frequency Distribution Table of Limited Trial Student Learning Readiness Scores

No	Value Interval	Frequency (f)	Total Value (Σx)	Percentage (%)	Category
1	71 – 80	3	225	11.11%	Not Ready to Learn
2	81 – 90	11	960	40.74%	Ready to Learn
3	91 – 100	13	1265	48.15%	Very Ready to Learn
Total		27	2450	100%	
Average			90.74		

A limited trial was conducted on 27 students to determine their level of learning readiness using a validated questionnaire instrument. The calculation results showed a total score of 2450 with an average of 90.74%. A total of 24 students (88.9%) were categorized as Ready to Learn. This indicates that most students have adequate physical, psychological, and basic skills readiness to participate in learning. There were 3 students (11.1%) who were categorized as Not Ready to Learn with a score of 75%. This finding is important as an indication of differences in individual conditions that need to be considered by teachers, both in aspects of motivation, concentration, and external support (e.g., the high level of student learning readiness (on average in the Ready to Learn category) supports the effectiveness of the implementation of digital-based diagnostic tests. The instrument used has been proven to be able to identify student readiness comprehensively, while also revealing a picture of the diversity of readiness in the classroom.

Academic diagnostic test limited test results table

No	Criteria	Pre Frequency	Post Frequency	Σx Pra	Σx Pasca	Pre Percentage (%)	Post Percentage (%)
1	Very good	12	14	1050	1280	44.44%	51.85%
2	Good	11	10	880	850	40.74%	37.04%
3	Enough	4	3	315	225	14.81%	11.11%
Total		27	27	2245	2355	100%	100%
Average				83.14	87.22		

Based on the limited test results table for the academic diagnostic test, there was an increase in student learning outcomes after the diagnostic test was administered. The average student score increased from 83.14 in the pre-test to 87.22 in the post-test, which is considered excellent. This improvement indicates that the academic diagnostic test provides a more accurate picture of student abilities and supports improvements in the learning process.

Table of student responses to digital-based diagnostic tests

No	Criteria	Frequency (f)	Total Value (Σx)	Percentage (%)	Category
1	Very Good (≥85)	0	0	0%	There isn't any
2	Good (70–84)	22	1611	81.48%	Dominant
3	Enough (<70)	5	408	18.52%	Low
Total		27	2019	100%	
Average			74.77		Good

Based on the table, the total student response score was 2019 with an average of 74.77. This average value indicates that student responses to the implementation of digital-based diagnostic tests were in the good category, thus concluding that students generally showed a positive attitude toward the use of this instrument.

The response scores ranged from 64 (lowest) to 80 (highest). This variation in scores indicates that most students found digital-based testing helpful, comfortable, and adaptable. However, a number still faced challenges, including understanding instructions, application interface, and familiarity with digital devices.

Table of teacher responses to digital-based diagnostic tests							
No	Aspect		Number of Statements	Total Score	Average	Percentage (%)	Category
1	Efficiency	and	4	46	3.83	95.83%	Very good
	Convenience						
2	Appearance	and	4	46	3.83	95.83%	Very good
	Comfort						
3	Language	and	3	35	3.89	97.22%	Very good
	Readability						
4	Suitability of Materials and Instructions		4	46	3.83	95.83%	Very good
5	Objectivity	and	5	57	3.8	95.00%	Very good
	Usefulness of Results						
Total			20	220		100%	
Overall average					3.83	91.66%	Very good

Teacher responses to digital-based diagnostic tests were excellent, with an average overall score of 91.66%. These results indicate that teachers accept and value digital tests as an effective and easily implemented assessment tool in learning. In terms of efficiency and convenience, teachers assessed digital tests as saving time, speeding up administration, and being easy to use for both teachers and students. Appearance and convenience also received positive reviews, indicating that the test design was engaging, facilitated comprehension, and increased student motivation without causing anxiety.

B. Large-scale trials

The large-scale trial was conducted in the same manner as the limited trial, including a learning readiness test, academic ability test, and teacher and student responses. The large-scale trial was administered to 96 Phase C grade 6 students at SDN 7 Mataram, with 6 teachers as the primary subjects.

Table of results of large-scale trials of student learning readiness.					
Value Range	Number of Students	Total value	Average	Percentage	Category
70 – 79	5 students	384	76.8	6.25%	(Quite Ready)
80 – 89	14 students	1177	84.07	15.63%	(Ready)
90 – 100	77 students	7057	91.64	78.12%	(Very ready)
Total	96 students	8618	89.77	100%	

Based on the analysis of 96 students, the majority were in the very prepared category. This was evident in the 77 students (78.12%) who scored in the 90–100 range, with an average of 91.64. Furthermore, 14 students (15.63%) were in the ready category with a score range of 80–89 and an average of 84.07. Meanwhile, 5 students (6.25%) were in the moderately ready category with a score range of 70–79 and an average of 76.8. Overall, the average score was 89.77, indicating that students' overall level of learning readiness was high. This indicates that most students were well prepared for the learning process.

Table 4.9 Results of the broad-scale test of the academic diagnostic test							
Value Range	Category	Number of students	Pretest		Number of students	Posts	
			Total value	Average		Total value	Average
0–100	Very good	34	3080	90.59	38	3560	93.68
80–89	Good	36	2910	80.83	48	4320	90
70–79	Enough	23	1725	75	8	620	77.5
60–69	Not enough	3	185	61.67	2	130	65
Total		96	7900	82.29	96	8630	89.9

Based on Table 4.9, the results of the academic diagnostic test at the pretest stage show that of the 96 students who took the test, the majority were in the good and very good categories. A total of 36 students were in the good category with a total score of 2910 and an average of 80.83, while 34 students were in the very good category with a total score of 3080 and an average of 90.59. In addition, there were 23 students in the sufficient category with an average of 75, and 3 students in the less than adequate category with an average of 61.67. Overall, the total pretest score was 7900 with an average of 82.29, which indicates that students' academic abilities before the treatment were in the good category.

After the learning process, the post-test results showed an increase in students' academic abilities. This was evident from the increase in the number of students in the excellent category to 38 students with a total score of 3560 and an average of 93.68. In the good category, the number of students also increased to 48 students with a total score of 4320 and an average of 90. Meanwhile, the number of students in the sufficient category decreased to 8 students, and the poor category also decreased to 2 students. The total post-test score reached 8630 with an average of 89.90, which showed an increase compared to the pre-test average.

In general, the results indicate an increase in students' academic abilities after the learning implementation, as indicated by an increase in the average score from 82.29 in the pretest to 89.90 in the posttest, as well as an increase in the number of students in the good and very good categories. Conversely, the number of students in the sufficient and poor categories decreased, indicating that most students experienced progress in

understanding the learning material. These findings indicate that the learning implemented in the large-scale test can have a positive impact on improving students' academic abilities.

Student response table to digital-based diagnostic tests on a large scale

Value Range	Category	Number of Students	Total Value	Average
70–80	Very good	68	5075	74.63
60–69	Good	28	1894	67.64
50–59	Enough	0	0	0
0–49	Not enough	0	0	0
Total		96	6969	72.59

Based on Table 4.10, the results of student responses to the digital-based diagnostic test in the large-scale test showed positive results. The majority of students scored in the 70–80 range, categorized as very good, with 68 students scoring an average of 74.63. This indicates that the majority of students responded very well to the use of the digital-based diagnostic test. Additionally, 28 students scored in the 60–69 range, categorized as good, with an average score of 67.64. Meanwhile, no students fell into the fair or poor categories.

Overall, the 96 students obtained an average score of 72.59, which is considered excellent. These results indicate that the digital-based diagnostic test used in the large-scale testing received a positive response from students and can be used effectively in the learning evaluation process.

Table of Teacher Responses to Digital-Based Diagnostic Tests

No	Aspect	Number of State ment s	Total Aspe ct Score	Aver age Aspe ct	Total Responde nt Score	Percentage (%)
1	Efficiency and Convenience	4	89	22.25	429	89.38
2	Appearance and Comfort	4	92	23	429	89.38
3	Language and Readability	3	67	22.33	429	89.38
4	Suitability of Materials and Instructions	4	92	23	429	89.38
5	Objectivity and Usefulness	5	111	22.2	429	89.38
	TOTAL	20	451	22.55	429	89.38

Based on Table 4.11, teacher responses to digital-based diagnostic tests in the large-scale trial showed excellent results. This is evident from the average score of 89.38%, indicating that teachers positively assessed the use of digital-based diagnostic tests in learning. In terms of efficiency and convenience, most teachers stated that digital tests save time in the correction process and simplify test administration compared to manual tests. Teachers also found the digital testing platform relatively easy to operate and easy for students to use without much difficulty.

In terms of appearance and usability, teachers found the digital test display quite appealing and suited to the characteristics of elementary school students. Furthermore, the use of images or illustrations in the questions helped students understand the questions, making them more enthusiastic and motivated during the test. Regarding language, readability, and appropriateness of the material, teachers stated that the questions presented aligned with classroom learning outcomes and reflected the competencies outlined in the Independent Curriculum. The test instructions were also deemed clear and easy for students to understand.

Meanwhile, regarding the objectivity and usability of the results, teachers assessed that the digital testing system was capable of correcting answers automatically and objectively. The test results were also quickly understandable and could be used to design more appropriate learning strategies, including developing differentiated learning tailored to student needs. Overall, the results indicate that the digital-based diagnostic test is highly effective and suitable for use as an evaluation tool to help teachers understand student abilities and design more effective learning. Teachers reported that this product saves time on manual analysis, speeds up decision-making, and improves the accuracy of student-centered learning strategies.

Discussion

The research results show that digital-based diagnostic tests have a very high level of practicality, with a percentage of 89.38%. Teachers assessed this instrument as being able to simplify assessment implementation through faster and more efficient question distribution, data processing, and result analysis. This finding aligns with the Technology Acceptance Model, which states that technology acceptance is influenced by perceived ease of use and benefits. In terms of appearance, the instrument received an excellent response due to its attractive, systematic, and easy-to-understand design. The communicative visual display helped increase student comfort, motivation, and engagement during the assessment process. This supports Multimedia Learning theory, which asserts that the use of visual elements can improve student focus and understanding.

Expert validation results showed a feasibility level of 93.63%, categorized as highly valid. The instrument was deemed to meet the requirements of material, construction, language, and assessment rubric. Improvements were made through the integration of LOTS and HOTS questions, allowing the instrument to more comprehensively measure both basic and higher-order thinking skills.

The developed diagnostic test also supports the implementation of differentiated learning within the Independent Curriculum. Through data on students' learning readiness, interests, and learning profiles, teachers can design learning strategies that better suit individual student needs. Furthermore, the automated correction system enhances the objectivity and efficiency of assessments and facilitates teachers' determination of follow-up learning strategies.

The instrument's effectiveness was demonstrated by an increase in average student learning outcomes from 82.29 to 89.90 after implementing the digital-based diagnostic test. This improvement demonstrates that utilizing diagnostic data can help teachers adapt instruction more appropriately, thus positively impacting student learning outcomes.

The novelty of this research lies in the development of a digital-based diagnostic test that integrates academic and non-academic aspects, including learning readiness, interests, and learning profiles, into a single platform. This integration enables the assessment to function not only as a tool for identifying initial abilities but also as a basis for planning differentiated learning that is adaptive, practical, and relevant to the implementation of the Independent Curriculum.

CONCLUSION

Based on a series of research and development processes for digital-based diagnostic tests that have been implemented, the following conclusions were obtained:

1. Validity of Digital Diagnostic Tests

The developed digital-based diagnostic test demonstrated a very high level of validity in terms of content, construction, and language use. Expert assessments indicate that this instrument meets the criteria for suitability as an assessment tool. The test is able to identify students' initial abilities while mapping their learning needs comprehensively, encompassing readiness, interests, and learning characteristics. Therefore, this instrument can be used as a foundation for designing differentiated learning in accordance with the principles of the Independent Curriculum.

2. Practicality of Digital Diagnostic Tests

In terms of practicality, the developed digital diagnostic test is considered excellent. This is evident in its ease of use by both teachers and students, as well as the positive feedback from users. The digital system used simplifies the process of administering the test, processing data, and presenting results quickly and efficiently. Therefore, this instrument is considered practical and supports the optimal implementation of differentiated learning in the classroom.

3. Effectiveness of Digital Diagnostic Tests

Digital diagnostic tests have proven effective in supporting differentiated learning processes. This is demonstrated by the improvement in student learning outcomes after using the instrument, as well as the high levels of identified learning readiness. In addition to serving as an evaluation tool, these tests also serve as a basis for making more informed learning decisions. Thus, the use of digital diagnostic tests significantly contributes to improving the quality of learning within the context of the Independent Curriculum.

REFERENCES

- Abarca, R. M. (2021). Penyusunan Tes Diagnostik Fisika Materi Listrik Dinamis. *Nuevos Sistemas de Comunicación e Información*, 1(2), 2013–2015.
- Annisak, W., Astalini, & Pathoni, H. (2017). Desain Pengemasan Tes Diagnostik Miskonsepsi Berbasis CBT (Computer Based Test). *Jurnal EduFisika*, 2(1), 1–12.
- Azahra, A.P. & WasiS, W. (2023). Pengembangan, Uji Validitas, Dan Uji Reliabilitas Instrumen Tes Diagnostik Berformat Five Tier Pada Materi Hukum Newton. *Jurnal Riset Rumpun Matematika Dan Ilmu Pengetahuan Alam*, 2(2), 196–207. <https://doi.org/10.55606/jurrimipa.v2i2.1556>
- Berliana, D., & Atikah, C. (2023). Teori Multiple Intelligences Dan Implikasinya Dalam Pembelajaran. *Jurnal Citra Pendidikan*, 3(3), 1108–1117. <https://doi.org/10.38048/jcp.v3i3.963>
- Bisri, MohFitriyah, F. (2023). Pembelajaran Berdiferensiasi Berdasarkan Keragaman Dan Keunikan Siswa Sekolah Dasar. *Jurnal Review Pendidikan Dasar: Jurnal Kajian Pendidikan Dan Hasil Penelitian*, 9(2), 67–73. <https://doi.org/10.26740/jrpd.v9n2.p67-73>
- Faiz, A., Pratama, A., & Kurniawaty, I. (2022). Pembelajaran Berdiferensiasi dalam Program Guru Penggerak pada Modul 2.1. *Jurnal Basicedu*, 6(2), 2846–2853. <https://doi.org/10.31004/basicedu.v6i2.2504>
- Sugiyono. (2018). *Metode Penelitian R&D*. Alfabeta.
- Sudjana, N. (2010). *Penilaian hasil proses belajar mengajar*.
- Wahyudi, F., Didik, L. A., & Program, B. (2021). Pengembangan Instrumen Three Tier Test Diagnostik Untuk Menganalisis Tingkat Pemahaman Dan Miskonsepsi Siswa Materi Elastisitas Development of Three Tier Diagnostic Instruments Test To Analyze Student’S Level of Understanding and Misconceptions of Elastic. *Jurnal Riset Inovasi Pembelajaran Fisika*, 4(2). <http://ojs.unimal.ac.id/index.php/relativitas/>