

Development of a Plickers-Based Formative Test for Grade III IPAS Learning at SD Negeri 2 Langsa

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Abstract

- Purpose** : This study was motivated by the limited use of technology-based formative assessment in Grade III IPAS learning at SD Negeri 2 Langsa. Conventional assessment practices were considered less efficient because they required more time, delayed access to results, and provided limited opportunities for active student engagement. Therefore, this study aimed to develop a Plickers-based formative test and examine its validity and practicality as an alternative assessment tool for elementary IPAS learning.
- Method** : This study employed a Research and Development (R&D) approach using the Four-D (4-D) model, consisting of Define, Design, Develop, and Disseminate stages. The participants were 11 Grade III students of SD Negeri 2 Langsa in the 2025/2026 academic year. Data were collected through observation, interviews, questionnaires, and documentation. Product validity was assessed by content, language, and test-item experts, while practicality was evaluated through teacher and student response questionnaires. The data were analyzed using descriptive quantitative analysis based on percentage scores.
- Results** : The findings showed that the Plickers-based formative test was successfully developed through the stages of the 4-D model. Expert validation indicated that the product met the validity criteria, with valid assessments from content and test-item experts and a highly valid assessment from the language expert. In addition, teacher and student responses showed that the developed formative test was highly practical for use in Grade III IPAS learning. The use of Plickers also supported a more interactive assessment process without requiring each student to use an individual digital device.
- Conclusion** : The developed Plickers-based formative test meets the criteria of validity and high practicality and is suitable for use as an alternative formative assessment tool in Grade III IPAS learning. The study highlights the potential of Plickers to support more efficient, interactive, and accessible formative assessment, particularly in elementary schools with limited student access to digital technology.

Keywords: formative assessment, Plickers, IPAS, research and development, elementary school.

1. Introduction

Education is a process aimed at developing individuals' potential and abilities optimally through the development of skills, attitudes, and character. Through education, individuals are expected to develop into independent, responsible, active, and socially capable persons while

maintaining spiritual values (Sadewo et al., 2021). In line with this perspective, Syaadah et al. (2022) stated that education is a conscious and planned process implemented through formal, informal, and non-formal pathways to develop individual potential, shape personality, and improve students' skills. Furthermore, Law Number 20 of 2003 concerning the National Education System emphasizes that education aims to develop students into individuals who have faith and devotion to God Almighty, possess noble character, are knowledgeable, creative, independent, healthy, democratic, and responsible citizens. These educational objectives serve as both guidelines and indicators for evaluating the success of educational implementation.

Elementary school represents the first stage of formal education and plays an important role in establishing the foundation for students' knowledge, intellectual development, and character formation. At this level, education is expected to prepare students to become independent individuals and provide them with the fundamental competencies necessary to continue their education at higher levels. Therefore, learning processes in elementary schools need to be designed according to students' developmental characteristics and learning needs.

The curriculum serves as a fundamental guideline for implementing learning activities, including the formulation of learning objectives, learning materials, learning experiences, strategies, and instructional methods that are adapted to students' needs (Ilmawan, 2024). In Indonesia, the Merdeka Curriculum provides greater flexibility for teachers to adapt learning tools and instructional activities to the characteristics and needs of students. This flexibility is expected to support more effective learning and provide students with opportunities to understand learning materials more deeply (Fauzi, 2022). In addition, the Merdeka Curriculum aims to optimize students' potential through the development of academic and non-academic competencies, character formation, independence, and creativity as preparation for future challenges (Yunita et al., 2023).

One of the important changes in the implementation of the Merdeka Curriculum at the elementary school level is the integration of Natural Sciences (*Ilmu Pengetahuan Alam*/IPA) and Social Sciences (*Ilmu Pengetahuan Sosial*/IPS) into the subject of Natural and Social Sciences (*Ilmu Pengetahuan Alam dan Sosial*/IPAS). This integration is intended to provide students with a more comprehensive understanding of natural phenomena and social life. Through IPAS learning, students learn about the characteristics of living and non-living things and the relationships between them, while also developing an understanding of human life as individuals and social beings who interact with both natural and social environments (Zakarina et al., 2024).

IPAS is an integrated subject that combines concepts from natural and social sciences to develop students' understanding of natural phenomena and social life. Learning in IPAS is not limited to conceptual understanding but is also expected to promote critical thinking, problem-solving, collaboration, and environmental and social awareness through meaningful and contextual learning experiences (Yesin et al., 2018).

The implementation of IPAS learning should be directed toward achieving predetermined learning objectives. In Grade III of SD Negeri 2 Langsa, IPAS learning in Chapter 6, *I Am Part of Society*, particularly the topic *The City or Regency Where I Live (Langsa City)*, requires students to recognize the location of their city or regency and province, identify regional characteristics based on geographical and environmental conditions, and explain the relationship between natural

conditions and community life. Students are also expected to understand the potential of their local area and demonstrate concern for their surrounding environment. Therefore, assessment in IPAS learning should not merely measure students' ability to recall information but should also evaluate their ability to understand, analyze, and apply learned concepts in real-life contexts.

The achievement of learning objectives requires a systematic assessment process that is aligned with learning outcomes, learning objectives, and learning indicators. One form of assessment that plays an important role in the learning process is formative assessment. Formative tests are used to measure students' levels of mastery of learning materials and provide information regarding the achievement of learning objectives (Muamar et al., 2025). The results of formative assessment can provide teachers with information about students' understanding and become the basis for evaluating the effectiveness of the learning process.

Within the Merdeka Curriculum, formative assessment does not only function to determine students' mastery of learning materials. It also provides a basis for teachers to give feedback and design appropriate follow-up learning activities. Therefore, formative tests should be able to measure the achievement of learning objectives validly, provide learning results quickly and accurately, and support assessment practices that are appropriate to students' characteristics and the principles of the curriculum (Efendi et al., 2024). Through formative assessment, teachers can identify students' levels of understanding and determine appropriate instructional actions based on the results obtained.

However, preliminary observations conducted during IPAS learning in Grade III at SD Negeri 2 Langsa revealed several challenges in the implementation of formative assessment. Formative tests were still predominantly conducted using conventional methods, particularly written tests. The questions used tended to emphasize students' ability to memorize learning materials and were not sufficiently connected to students' everyday experiences. In addition, the manual process of checking students' answers required a considerable amount of time, preventing teachers from obtaining assessment results and providing feedback promptly.

Another challenge is that conventional formative tests tend to be less interactive and less engaging for elementary school students. At the same time, the limited availability of digital devices among students creates obstacles to implementing technology-based or online assessments that require each student to have access to a smartphone or computer. Nevertheless, SD Negeri 2 Langsa has supporting facilities, including projectors and an adequate internet connection. These conditions provide an opportunity to utilize educational technology that does not require every student to own an individual digital device.

The existing conditions indicate a gap between the ideal implementation of formative assessment and the assessment practices currently applied in the classroom. Ideally, formative tests should be designed according to learning objectives, be practical for teachers to administer, and provide assessment results quickly, objectively, and accurately. However, the formative assessment process at SD Negeri 2 Langsa remains dominated by conventional approaches, resulting in a relatively slow scoring process and limited use of technology to support assessment activities.

One alternative that can be used to address this problem is the development of formative tests based on *Plickers*. *Plickers* is a technology-based assessment medium that allows teachers to conduct interactive formative assessments using only one smartphone, while students respond to questions

using *Plickers* cards. Students' responses can be scanned using the codes displayed on the cards, allowing teachers to obtain assessment results in real time. The use of *Plickers* can simplify the assessment process and create a more interactive and engaging learning experience for elementary school students.

The use of *Plickers* is particularly relevant for schools with limited student access to digital devices because students do not need to use smartphones or computers individually during the assessment process. This medium can therefore support the implementation of more efficient formative assessments while enabling teachers to obtain information about students' learning achievement more quickly. The availability of immediate assessment results can also support teachers in providing feedback and determining appropriate follow-up learning activities.

Based on these considerations, the development of a formative test based on *Plickers* is expected to provide an alternative assessment medium that is aligned with the characteristics of elementary school students and the learning objectives of IPAS. The developed formative test is expected to support a more interactive, practical, and efficient assessment process while providing teachers with rapid information regarding students' understanding of learning materials. Therefore, this study applies a *Research and Development* (R&D) approach using the 4-D model, consisting of *Define, Design, Develop, and Disseminate*, under the title "Development of a *Plickers* Media-Based Formative Test for the IPAS Subject in Grade III at SD Negeri 2 Langsa."

2. Method

Research Design

This study employed a Research and Development (R&D) approach to develop and examine the feasibility of a *Plickers*-based formative test for the Natural and Social Sciences (*Ilmu Pengetahuan Alam dan Sosial* [IPAS]) subject in Grade III at SD Negeri 2 Langsa. The development process adopted the Four-D (4-D) model proposed by Thiagarajan et al. (1974), which consists of four systematic stages: *Define, Design, Develop, and Disseminate*. The model was selected because it provides a systematic procedure for developing an educational product, beginning with needs identification and continuing through product design, validation, revision, practicality testing, and limited dissemination.

The developed product consisted of multiple-choice formative test items integrated with the *Plickers* assessment medium. The development process was directed toward producing an assessment instrument that was valid and practical for use in Grade III IPAS learning.

Research Site and Participants

The study was conducted at SD Negeri 2 Langsa, located in Langsa City, Aceh, Indonesia, during the 2025/2026 academic year. The participants were 11 Grade III students and the Grade III classroom teacher. The students participated in the practicality testing of the developed formative test, while the teacher provided information during the needs analysis and evaluated the practicality of the product. The object of the study was the development of a *Plickers*-based formative test for the IPAS subject.

Development Procedure

The product was developed using the Four-D (4-D) model proposed by Thiagarajan et al. (1974).

Define Stage

The *Define* stage aimed to identify and determine the learning and assessment needs as the basis for product development. This stage consisted of five activities.

First, a *front-end analysis* was conducted to identify problems related to the implementation of formative assessment in Grade III IPAS learning. Preliminary observations indicated that formative assessment was still dominated by conventional written tests, scoring was conducted manually, and feedback could not always be provided immediately.

Second, a *learner analysis* was conducted to identify students' initial abilities, cognitive development, learning interests, and experiences in participating in classroom assessments. This analysis was intended to ensure that the developed formative test was appropriate for the characteristics of elementary school students.

Third, a *task analysis* was conducted by identifying the competencies that students were expected to achieve based on the learning outcomes and learning objectives for the topic *The City or Regency Where I Live (Langsa City)*.

Fourth, a *concept analysis* was conducted to identify the main concepts related to the topic. The results were used as the basis for developing learning indicators, test specifications, and formative test items.

Finally, instructional objectives were formulated based on the results of the task and concept analyses. The objectives were aligned with the learning outcomes and learning objectives of the Merdeka Curriculum to ensure that the developed test measured the intended student competencies.

Design Stage

The *Design* stage involved preparing the initial design of the formative test based on the results of the needs analysis. The activities included developing a test blueprint, formulating multiple-choice test items, determining answer keys, selecting *Plickers* as the assessment medium, and preparing the initial product prototype.

The test blueprint was developed by aligning the learning outcomes, learning objectives, learning indicators, and content related to the topic *The City or Regency Where I Live (Langsa City)*. The resulting prototype was subsequently evaluated and revised during the development stage.

Develop Stage

The *Develop* stage focused on producing a feasible formative test through expert validation and product revision. The initial prototype was evaluated by three experts, consisting of a content expert, a test-item expert, and a language expert. Their assessments were used to determine the validity and appropriateness of the developed product.

The validation of the test items covered four main aspects: alignment with learning outcomes, learning objectives, indicators, and learning content; item construction; language use; and item presentation. The validation framework was adapted from Hayati et al. (2023), as summarized in Table 1.

Table 1. Test-Item Expert Validation Framework

Assessment aspect	Number of items
Alignment of test items with learning outcomes, learning objectives, indicators, and content	4
Appropriateness of test-item construction	3
Appropriateness of language use	2
Appropriateness of item presentation	1
Total	10

The content expert validation focused on the alignment of the content with learning outcomes and learning objectives, content quality, and content presentation. The framework was adapted from Perkasa et al. (2018), as presented in Table 2.

Table 2. Content Expert Validation Framework

Assessment aspect	Number of items
Alignment of content with learning outcomes and learning objectives	2
Content quality	4
Content presentation	2
Total	8

Language validation focused on language clarity and effectiveness, appropriateness for students' characteristics, and conformity with Indonesian language conventions. The framework was adapted from Firdaini Aulia et al. (2024), as presented in Table 3.

Table 3. Language Expert Validation Framework

Assessment aspect	Number of items
Language clarity and effectiveness	4
Appropriateness of language for students' characteristics	3
Conformity with Indonesian language conventions	2
Total	9

Following expert validation, the product was revised according to the experts' comments and suggestions. The revised formative test was then subjected to practicality testing involving the Grade III teacher and 11 students.

Teacher practicality was evaluated based on five aspects: alignment with learning activities, ease of use, item presentation, student engagement, and ease of assessment. The teacher questionnaire consisted of 10 statements addressing the suitability of the formative test for IPAS learning, ease of using *Plickers*, clarity of the questions, student participation and interest, and the efficiency of obtaining assessment results.

Student practicality was evaluated through 10 questionnaire statements covering learning relevance, ease of use, presentation, and motivation and participation. The questionnaire examined whether the questions were aligned with the learning material, whether the *Plickers* cards were easy to use, whether the presentation was clear and engaging, and whether the formative assessment increased students' motivation, participation, and enjoyment during the evaluation process. The student response instrument was adapted from Aminaty et al. (2024).

Disseminate Stage

The *Disseminate* stage was conducted on a limited scale. The validated and practical formative test was introduced to the Grade III teacher at SD Negeri 2 Langsa as a potential alternative for conducting formative assessment in IPAS learning. The dissemination was limited to the research site because the study focused primarily on product development and the examination of its validity and practicality.

Data Collection Techniques and Instruments

This study used qualitative and quantitative data. Data were collected through observation, interviews, questionnaires, and documentation.

Observation was conducted to identify the implementation of formative assessment in IPAS learning, the assessment procedures applied by the teacher, the use of learning media, and the availability of facilities supporting the implementation of *Plickers*. Observation was used to obtain direct information regarding classroom activities and conditions relevant to the development process (Ardiansyah et al., 2023).

Interviews were conducted with the Grade III teacher to obtain information regarding the implementation of formative assessment, difficulties encountered during assessment, commonly used test formats, and the teacher's readiness to implement a *Plickers*-based formative test. Interviews were used to obtain in-depth information that could not be fully captured through observation (Rachmawati, 2007).

The teacher interview guide consisted of seven main indicators: (1) the implementation of formative assessment, (2) students' interest and participation, (3) implementation challenges, (4) commonly used formative test formats, (5) comparisons between conventional and digital assessment methods, (6) previous experience using assessment technology, and (7) readiness to implement *Plickers*.

Questionnaires were used to obtain expert validation data and practicality responses. The expert validation questionnaires were administered to the content, test-item, and language experts. Practicality questionnaires were administered to the Grade III teacher and students to evaluate ease of use, clarity of presentation, student engagement, and the implementation of the developed formative test (Ardiansyah et al., 2023).

Documentation was used to collect supporting information, including school profiles, student data, learning documents, validation results, questionnaire results, and photographs of the development and practicality testing activities (Ardiansyah et al., 2023).

Data Analysis

The data were analyzed using descriptive qualitative and quantitative approaches. Qualitative data consisted of observation results, interview findings, comments, suggestions, and written

responses from experts, teachers, and students. These data were organized, reduced, presented, and interpreted to identify weaknesses and guide product revision.

Quantitative data were obtained from expert validation scores and teacher and student practicality responses. The validity and practicality of the developed product were calculated using percentage scores.

Expert Validation Analysis

Expert validation scores were analyzed using the following formula:

$$P = (\Sigma x / N) \times 100 \%$$

where P represents the percentage score, Σx represents the total score obtained from the validator, and N represents the maximum possible score.

The validity criteria were adapted from Annisa et al. (2022), as presented in Table 4.

Table 4. Product Validity Criteria

Percentage	Qualification	Interpretation
0–20%	Very invalid	Revision is required
21–40%	Invalid	Revision is required
41–60%	Fairly valid	Minor revision is required
61–80%	Valid	No revision is required
81–100%	Very valid	No revision is required

Practicality Analysis

The practicality of the developed formative test was calculated using the following formula:

$$NP = (R / SM) \times 100\%$$

where NP represents the percentage score, R represents the score obtained, and SM represents the maximum score.

The practicality criteria were adapted from Putri and Reinita (2023), as shown in Table 5.

Table 5. Product Practicality Criteria

Percentage interval	Category
81–100%	Very practical
61–80%	Practical
41–60%	Fairly practical
21–40%	Less practical
≤20%	Impractical

Item Validity and Reliability Analysis

The validity of each test item was analyzed using the Pearson product-moment correlation coefficient. An item was considered valid when the obtained correlation coefficient (r_{xy}) met or exceeded the critical correlation value (r_{table}). Items that did not meet this criterion were considered invalid.

The reliability of the formative test was analyzed using Cronbach's alpha. The test was considered reliable when Cronbach's alpha was greater than 0.60, whereas a coefficient below 0.60 indicated insufficient reliability.

3. Result

Development of the Plickers-Based Formative Test

This study developed a *Plickers*-based formative test for the Natural and Social Sciences (*Ilmu Pengetahuan Alam dan Sosial* [IPAS]) subject in Grade III at SD Negeri 2 Langsa. The development process followed the Four-D (4-D) model consisting of the *Define*, *Design*, *Develop*, and *Disseminate* stages (Thiagarajan et al., 1974).

The *Define* stage was conducted to identify the problems and needs related to formative assessment in IPAS learning. The results of classroom observations and interviews with the Grade III teacher showed that formative tests were generally conducted using conventional written tests. The assessment and scoring processes were performed manually, requiring a relatively long time before teachers could obtain students' results. Consequently, feedback could not always be provided immediately. In addition, the implementation of formative tests tended to be less interactive because students answered questions only through written answer sheets, while the use of technology in the assessment process was still limited.

These findings indicated the need for an alternative formative assessment that could support a faster, more interactive, and efficient assessment process. Therefore, the development of a formative test integrated with the *Plickers* medium was considered appropriate for the learning conditions at SD Negeri 2 Langsa.

The learner analysis showed that Grade III students required assessment activities that were simple, interesting, and appropriate for their developmental characteristics. In addition, not all students had access to personal digital devices. Therefore, *Plickers* was considered suitable because students could participate in digital-based formative assessment using printed response cards without requiring individual smartphones or computers.

During the *Design* stage, the formative test was prepared based on the learning outcomes, learning objectives, learning indicators, and the topic *The City or Regency Where I Live (Langsa City)*. The test consisted of multiple-choice questions integrated into the *Plickers* application. Each question contained four answer alternatives, while the correct answer was predetermined in the system. Students responded by displaying their respective *Plickers* cards, and the teacher scanned the responses using a smartphone.

The product development process involved the preparation of question sets, answer alternatives, answer keys, and *Plickers* cards. The cards were printed and distributed to students before the formative assessment was conducted. This system enabled teachers to scan students' answers and obtain assessment results directly.

During the *Develop* stage, the product was evaluated by content, language, and test-item experts. The validation results were used as the basis for revising and improving the formative test. After the revision process, the product was tested with the Grade III teacher and 11 students to determine its practicality.

The development results showed that the *Plickers*-based formative test provided an alternative to conventional formative assessment. The product was designed not only to measure students' understanding of the learning material but also to support a faster assessment process and encourage active student participation.

The findings are consistent with the characteristics of *Plickers* as a technology-based assessment medium that can be implemented using only one digital device operated by the teacher (Aminaty et al., 2024). This characteristic is particularly relevant in schools where students have limited access to personal digital devices. Previous studies have also reported that *Plickers* can improve the efficiency of assessment and increase student participation during learning evaluation activities (Firdaini Aulia et al., 2024; Milova et al., 2025).

Validity of the Plickers-Based Formative Test

The validity of the developed formative test was evaluated through expert validation involving a content expert, a language expert, and a test-item expert. The results of the final validation are presented in Table 1.

Table 6. Summary of Expert Validation Results

Validation aspect	Validity percentage	Category
Content validity	80%	Valid
Language validity	93%	Very valid
Test-item validity	80%	Valid

The results showed that the developed formative test met the validity requirements in terms of content, language, and test construction.

The content validation obtained a percentage of 80%, which was categorized as valid. This result indicates that the material included in the formative test was aligned with the learning outcomes, learning objectives, learning indicators, and the characteristics of Grade III students. The questions were also relevant to the topic *The City or Regency Where I Live (Langsa City)*. Therefore, the developed items were considered capable of measuring the intended student competencies.

The language validation obtained the highest result, with a percentage of 93% and a very valid category. The improvement in the language validation results occurred after the product was revised based on the validator's suggestions. The result indicates that the language used in the formative test was clear, communicative, and appropriate for the cognitive and linguistic development of Grade III students.

Clear language is particularly important in formative assessment because students must first understand the meaning of the questions before demonstrating their knowledge. Inadequate or ambiguous language may affect students' responses and reduce the accuracy of the assessment. Therefore, the high language validity obtained in this study indicates that the developed test items were understandable and appropriate for elementary school students. This finding is consistent with Chasanah et al. (2022), who emphasized the importance of clear language in ensuring that students can properly understand the information presented in assessment instruments.

The test-item validation obtained a percentage of 80%, which was categorized as valid. The result indicates that the questions were developed according to the learning outcomes, learning

objectives, indicators, and learning content. The construction and presentation of the questions were also considered appropriate for formative assessment.

The use of multiple-choice questions was suitable for integration with the *Plickers* medium because students could select answers using the response cards, while teachers could obtain results through digital scanning. This approach supported a faster and more objective assessment process. Firdaus et al. (2025) also reported that multiple-choice tests can facilitate student responses while supporting more objective assessment procedures.

In addition to expert validation, the developed test items were tested empirically with 11 Grade III students. The item validity analysis using the Pearson Product-Moment correlation showed that all test items had calculated correlation coefficients higher than the critical value of 0.5529. The obtained correlation coefficients ranged from 0.557 to 0.776. Therefore, all test items were categorized as valid.

The reliability analysis using Cronbach's alpha produced a coefficient of 0.963. This value exceeded the minimum criterion of 0.60, indicating that the developed formative test had a very high level of reliability. These findings demonstrate that the developed test not only met expert validity requirements but also showed satisfactory empirical validity and reliability.

Overall, the results indicate that the *Plickers*-based formative test was appropriate for measuring students' learning outcomes on the topic *The City or Regency Where I Live (Langsa City)*. The combination of expert validation, item validity testing, and reliability analysis strengthens the feasibility of the developed product as a formative assessment instrument.

Practicality of the Plickers-Based Formative Test

The practicality of the developed formative test was evaluated through teacher and student response questionnaires after the product was implemented. The results are summarized in Table 2.

Table 7. Practicality Results of the Plickers-Based Formative Test

Respondent	Practicality percentage	Category
Teacher	98%	Very practical
Students	97.64%	Very practical

The teacher response obtained a practicality percentage of 98%, which was categorized as very practical. This result indicates that the developed formative test was easy to implement in classroom learning. The teacher considered the instructions and implementation procedures clear, while the questions were aligned with the learning objectives and learning indicators.

The use of *Plickers* also enabled the teacher to display questions, scan student responses, and obtain assessment results in real time. Compared with conventional written tests, this process reduced the need for manual checking and facilitated faster access to students' assessment results.

The findings are consistent with previous research indicating that *Plickers* can support teachers in conducting formative assessment more efficiently and obtaining student responses more quickly (Milova et al., 2025). The ability to obtain results directly can also support teachers in providing feedback and determining appropriate follow-up learning activities.

The student response obtained a practicality percentage of 97.64%, which was also categorized as very practical. The result indicates that students found the *Plickers*-based formative test easy to

use, interesting, and enjoyable. The use of printed response cards allowed students to participate without using personal smartphones or computers.

The high student practicality score suggests that the *Plickers* medium was appropriate for the characteristics of Grade III elementary school students. The assessment activity was not limited to answering questions on paper but involved students directly in selecting and displaying their responses. This created a more interactive assessment experience.

The findings are supported by Ulwa et al. (2025), who reported that the use of *Plickers* can increase student motivation, participation, and active involvement during learning activities. Similarly, the results of this study indicate that the integration of *Plickers* into formative assessment can make evaluation activities more engaging for elementary school students.

The practicality results also demonstrate that technology-based assessment does not necessarily require every student to have access to a personal digital device. In the *Plickers* system, the teacher operates the digital application, while students use printed response cards. This feature makes the medium particularly suitable for schools with limited student access to smartphones or computers.

Overall Findings

The overall results demonstrate that the *Plickers*-based formative test developed in this study was valid, reliable, and highly practical for use in Grade III IPAS learning at SD Negeri 2 Langsa. The final expert validation results showed that the product obtained 80% content validity, 93% language validity, and 80% test-item validity. Furthermore, all test items were empirically valid, with correlation coefficients ranging from 0.557 to 0.776, while the reliability coefficient reached 0.963.

The practicality evaluation also showed highly positive results, with a score of 98% from the teacher and 97.64% from the students. These findings indicate that the developed formative test was easy to use and appropriate for the learning conditions and characteristics of Grade III students.

The findings support the use of *Plickers* as an alternative formative assessment medium in elementary schools. The medium enables teachers to conduct assessments more efficiently while providing students with a more interactive and engaging evaluation experience. Therefore, the developed *Plickers*-based formative test can be considered a feasible alternative to conventional formative assessment for IPAS learning, particularly in schools where students have limited access to personal digital devices.

4. Discussion

The findings of this study indicate that the developed *Plickers*-based formative test was valid, reliable, and highly practical for use in Grade III IPAS learning at SD Negeri 2 Langsa. The expert validation results showed that the product met the validity criteria in terms of content, language, and test construction. In addition, the empirical testing showed that all test items were valid, with a Cronbach's alpha coefficient of 0.963, indicating a very high level of reliability. These results suggest that the developed formative test was able to measure students' learning outcomes consistently and in accordance with the intended learning objectives.

The practicality results also demonstrated that the product was highly acceptable to both teachers and students. The teacher response reached 98%, while the student response reached

97.64%, both categorized as very practical. These findings indicate that the *Plickers*-based formative test was easy to implement and appropriate for the characteristics of Grade III elementary school students. The use of *Plickers* allowed students to participate actively in the assessment process while enabling teachers to obtain student responses more quickly.

The findings support previous studies suggesting that *Plickers* can be used as an alternative technology-based evaluation medium that promotes interactive and efficient assessment activities (Aminaty et al., 2024; Firdaini Aulia et al., 2024; Milova et al., 2025). The use of printed response cards also represents an important advantage because students do not need to own smartphones or computers to participate in the assessment. This characteristic makes *Plickers* suitable for schools with limited access to individual digital devices.

Furthermore, the integration of the *Plickers* medium with contextual IPAS content related to Langsa City enabled the formative test to be relevant to students' learning experiences. Thus, the developed product not only provided an alternative to conventional paper-based formative tests but also supported a more interactive, efficient, and contextual assessment process. Overall, the results demonstrate that the *Plickers*-based formative test is a feasible assessment medium for supporting formative evaluation in Grade III IPAS learning.

5. Conclusion

This study concludes that the *Plickers*-based formative test developed for Grade III IPAS learning at SD Negeri 2 Langsa is a feasible and practical assessment medium for supporting formative evaluation. The developed test is appropriate in terms of learning content, test construction, and language, and it can be consistently used to assess students' understanding of the learning material. In addition, the use of *Plickers* provides a more interactive and efficient assessment process, enables teachers to obtain student responses more quickly, and can be implemented without requiring individual digital devices for each student. Therefore, the developed product can serve as an alternative to conventional formative assessment and support the implementation of more interactive, contextual, and technology-based assessment in elementary IPAS learning.

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