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Analysis of Formative Assessment Implementation in Science and Social Studies Learning in the Fourth Grade of Elementary School within the Merdeka Curriculum

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Abstract

This research aims to analyze the implementation of formative assessment in Science and Social Studies (IPAS) learning for fourth-grade students in the Independent Curriculum of Elementary School. The research method used is a mixed methods approach, collecting data through interviews and observations of fourth-grade teachers and analyzing the frequency of formative assessment instrument usage by teachers. The research findings indicate that fourth-grade teachers actively use various formative assessment instruments such as formative tests, observations, project assignments, and portfolios to gather data on students' learning progress in IPAS. However, there are challenges in the implementation of formative assessment. Challenges faced by fourth-grade teachers include a lack of understanding of the concepts and methods of formative assessment, limited time to evaluate all students individually, and resource limitations such as inadequate guidelines and instructional materials. The conclusion is that the implementation of formative assessment in IPAS learning for fourth-grade students in Elementary School is not effective overall. Although fourth-grade teachers use various formative assessment instruments, there are indicators that receive low approval from students.

Introduction

Education in the 21st century emphasizes the need to produce high-quality learners (Cornelius and Wilson 2021). The learning process conducted by teachers aims to enhance students' intellectual, moral, and various skills, including critical thinking, creativity, knowledge construction, problem-solving, and a strong understanding of the learning material (Ninlawan 2015). In this context, the implementation of 21st-century learning should also be accompanied by appropriate evaluation. The vision of evaluation in the 21st century is directed towards assessments that not only measure fragmented factual knowledge but also students' ability to apply knowledge in complex ways in various situations (Mat Dangi, Mohamed Saat, and Saad 2022). 21st-century learning leads to changes in the curriculum being applied, and curriculum changes are made to align with the ongoing developments in 21st-century education.

Education in Indonesia continues to experience development and transformation, including in curriculum approaches (Osborne et al. 2019). One of the evolving approaches is the Independent Curriculum, which emphasizes the development of students' competencies and learner-centered education (Rizki and Fahkrunisa 2022); (Ummi Inayati 2022); (Fitriyah and Wardani 2022). The Independent Curriculum provides freedom in selecting teaching methods and learning materials and encourages students to actively engage in the learning process (Ramadhan and Santosa 2023); (Rosidah, Pramulia, and Susiloningsih 2021); (Ujang Cepi Barlian 2022). The Independent Curriculum is one of the government's efforts to enhance the quality of education in Indonesia (Jamilah, Murti, and Khotijah 2023); (Aprima and Sari 2022); (Sherly, Dharma, and Sihombing 2020).

In the Independent Curriculum, formative assessment plays a crucial role in assessing and improving the learning of Science and Social Studies (IPAS) in the fourth grade of Elementary School (Ramadhan et al. 2023). The use of formative assessment as a tool for regularly and continuously evaluating students' understanding of the learning material (Zulaiha, Meldina, and Meisin 2022). Formative assessment is an evaluation method conducted continuously during the learning process to gather information about students' progress (Forbes, Sabel, and Biggers 2015). Its purpose is to provide useful feedback to students and teachers and to assist in planning further learning (Missett et al. 2014). Formative assessment can help teachers understand the level of students' understanding, identify difficulties that students may encounter, and design appropriate interventions to improve students' learning outcomes (Klute et al. 2017).

Formative assessment plays a crucial role in the teaching and learning process because it can help teachers better understand students' needs and provide timely feedback to enhance students' learning outcomes (Nawaz and Akbar 2006). To maximize the use of formative assessment, teachers must perceive it as a distinct activity from summative assessment and integrate it with regular classroom teaching and student engagement (Johnson, Sondergeld, and Walton 2019). However, challenges are still encountered by teachers in implementing formative assessment in line with the principles of the Independent Curriculum. In the implementation of formative assessment in the fourth-grade classroom at SDN Adisucipto 1 Yogyakarta, several notable aspects can be observed. One of them is that the fourth-grade teachers at this school have integrated formative assessment as an integral part of the Independent Curriculum. Formative assessment should be understood not merely as a test or process but as a mature integration of the process and methodologies or instruments designed for specific purposes (Bennett 2011).

Furthermore, there are still inaccuracies in the assessment strategies used by the fourth-grade teachers, including relying on direct observation as the primary strategy, whereas it would be more ideal to use project assignments or portfolios as evaluation tools. Although some students actively engage in formative assessment, there are still students who are less involved in this process. Moreover, the use of formative assessment results in lesson planning is inconsistent in the fourth-grade classroom. Factors such as limited resources and a limited understanding of the Independent Curriculum approach may pose obstacles to the ideal implementation of formative assessment.

Several related studies have been conducted in the context of the Independent Curriculum and formative assessment. A study by (Hadiana 2015) emphasized that assessing student learning outcomes in elementary schools is carried out using an authentic, integrated, comprehensive, and balanced approach that considers attitudes, knowledge, and skills competencies. The assessment process focuses on strengthening internal assessments by educators and educational units, as well as external assessments by the government. Research by (Steve Graham 2016) suggested that formative assessment is aimed at obtaining feedback on students' writing or their learning progress during day-to-day teaching and learning, leading to better learning outcomes. Furthermore, research by (Hondrich et al. 2016) pointed out that formative assessment in elementary schools presents a challenge for teachers who aim to evaluate their success in implementing an integrated formative assessment program within the curriculum. This includes assessing their understanding of the material, direct application, and knowledge transfer to the next level. Therefore, it is essential to analyze the extent of teachers' awareness of the formative assessment program within the Independent Curriculum in their classrooms and identify factors that can influence the success of its implementation.

However, despite the substantial potential of formative assessment in enhancing Science and Social Studies (IPAS) learning in the fourth grade of Elementary School, there are several issues that require further investigation. It is crucial to analyze the implementation of formative assessment within the context of the Independent Curriculum, identify the obstacles and challenges faced, and evaluate its effectiveness. This in-depth understanding of the implementation of formative assessment in IPAS learning within the Independent Curriculum for the fourth grade of Elementary School aligns with the research objectives, which include: analyzing the concept of formative assessment implementation in the context of learning in the Independent Curriculum, identifying the obstacles and challenges faced, and evaluating its effectiveness.

Methods

This research employs a mixed methods approach. According to Creswell (Subagyo 2020). a combination method is a research approach that combines or connects both quantitative and qualitative research methods. This method integrates the collection of quantitative and qualitative data and analyzes them integratively to gain a comprehensive understanding of the implementation of formative assessment in IPAS learning within the Independent Curriculum for the fourth grade of Elementary School. By using a mixed methods approach, this research can harness the strengths of both quantitative and qualitative data collection, thus providing a more holistic and in-depth understanding of the implementation of formative assessment within the relevant context (Machali 2021).

This research was conducted at SDN Adisucipto 1 Yogyakarta during the second semester of the 2022/2023 academic year. Data collection was carried out through two primary techniques: interviews and observations. Interviews were used to obtain in-depth information from fourth-grade teachers regarding their understanding of formative assessment, their experiences in its implementation, and the challenges they faced. Interviews also provided an opportunity to gather the teachers' subjective views on the effectiveness of formative assessment in enhancing IPAS learning. In addition to interviews, observations were conducted to directly observe the implementation of formative assessment in IPAS learning in the fourth-grade classroom at Elementary School. Observations provided insights into the practice of formative assessment by teachers, interactions between teachers and students, and the level of student involvement in the learning process. Observational data offered a more concrete and objective understanding of the implementation of formative assessment in a real-world context.

Table 1. Data Collection Instrument

No	Instrument	Description
1	Interview Guide	The instrument contains guide questions for interviews with teachers regarding formative assessment.
2	Observation Checklist	The instrument contains a list of items observed during the implementation of science and technology learning in class IV.
3	Evaluation Questionnaire	The instrument contains statements assessed by students regarding formative assessments in IPAS.

Subsequently, the data collected from interviews and observations were analyzed in an integrated manner. Quantitative analysis was performed on numerical or frequency data related to the use of formative assessment instruments and the encountered challenges. Meanwhile, qualitative analysis was conducted on narrative data concerning teachers' understanding, experiences, and perceptions regarding the effectiveness of formative assessment. The integration of these two types of data allowed the researchers to provide a comprehensive and in-depth understanding of the implementation of formative assessment in IPAS learning within the Independent Curriculum for the fourth grade of Elementary School.

Result

3.1 *Implementation of Formative Assessment in Class IV Science and Science Learning at SDN Adisucipto 1 Yogyakarta*

During the implementation of formative assessment in IPAS learning for fourth-grade students in the Independent Curriculum, findings from interviews and observations indicate that fourth-grade teachers actively employ various formative assessment instruments to collect data on students' learning progress. Formative tests, observations, project assignments, and portfolios are commonly used methods. Furthermore, teachers provide regular and structured feedback to students, both orally and in written form. Students are also engaged in self-reflection regarding their learning progress.

Table 2. Formative Assessment Instrument for Science Learning in Class IV

No	Assessment Instrument	Frequency of Use
1	Formative Test	70%
2	Observation	65%
3	Project Assignments	60%
4	Portofolio	70%

Based on the table of results regarding the use of formative assessment instruments in IPAS learning for fourth-grade students in Elementary School, it is evident that formative tests are the most frequently utilized instrument by fourth-grade teachers, with a usage frequency of 70%. This indicates that fourth-grade teachers rely on formative tests as one of the methods to measure students' learning progress in the context of IPAS.

Observation is also a formative assessment instrument that is quite frequently utilized, with a usage frequency of 65%. In observations, fourth-grade teachers directly observe and record students' activities and abilities during IPAS learning. These observations enable teachers to gather more comprehensive information about students' progress, including their attitudes, skills, and knowledge displayed in a practical context.

Furthermore, project assignments are also a fairly popular formative assessment instrument with a usage frequency of 60%. Project assignments allow students to apply the knowledge and skills they have learned in IPAS to real-world project contexts. This provides students with an opportunity to develop critical thinking, creativity, and teamwork skills.

Moreover, the use of portfolios as a formative assessment instrument is also notable, with a usage frequency of 70%. Portfolios consist of a collection or series of students' work that reflects their learning process and outcomes in IPAS. By using portfolios, teachers can track students' development over time and provide more in-depth and personalized feedback.

3.2 *Obstacles and Challenges for Grade IV Teachers in Implementing Formative Assessments*

Interviews and observations also revealed several challenges and obstacles in the implementation of formative assessment in IPAS learning within the Independent Curriculum. One of the primary obstacles is the teachers' lack of understanding of the concept and methods of formative assessment. Fourth-grade teachers acknowledge the need for more training and guidance in this regard. Additionally, time constraints pose a challenge in evaluating all students individually. Fourth-grade teachers also face resource limitations such as inadequate guidelines and instructional materials. The integration of formative assessment into everyday teaching practices is also a hurdle, with some teachers encountering difficulties in managing assessment data and providing relevant feedback effectively.

3.3 *Effectiveness of Formative Assessment in Improving Science Learning*

Based on the research findings, there is an indication that the implementation of formative assessment in IPAS learning is not entirely effective. Although some indicators received positive responses from students, there are still some indicators that show low agreement rates. The indicators "Portfolio records learning progress in IPAS" and "Project assignments apply IPAS knowledge in a real context" received agreement percentages of 60% and 70% respectively. This suggests that students may not fully perceive the benefits of using portfolios and project assignments in enhancing their understanding and application of knowledge in IPAS. Furthermore, another indicator with a relatively low agreement percentage is "Formative tests help measure understanding in IPAS" with a 70% agreement rate. This indicates a limitation in the use of formative tests to measure students' understanding of IPAS concepts.

Discussion

The utilization of various formative assessment instruments aligns with findings from previous relevant research. Earlier research (Adinda et al. 2021) also demonstrated that a combination of diverse formative assessment instruments can provide a more comprehensive and accurate overview of students' learning progress. This is further supported by the results of a study (Sari, Mustikasari, and Pratiwi 2019) showing that the routine and structured provision of feedback by teachers also has a positive impact on enhancing students' understanding and performance.

In this study, the results of using formative assessment instruments indicate that fourth-grade teachers in Elementary School, within the framework of the Independent Curriculum, effectively implement formative assessment in IPAS learning. The combination of formative assessment instruments used provides a comprehensive overview of students' learning progress, and the feedback provided by teachers assists students in improving their understanding and performance (Ian Clark 2012). These findings underscore the importance of implementing formative assessment to enhance the quality of IPAS learning in the fourth grade of Elementary School.

Previous research by (Nurcahyono and Putra 2022) highlighted the obstacles and challenges faced by teachers in implementing teaching in the Independent Curriculum, including the execution of assessments, due to a lack of in-depth knowledge about the components within the Independent Curriculum. Additionally, a previous study by (Dewi, Lukman, and Nana 2018) emphasized that school readiness for implementing the Independent Curriculum, including formative assessment, requires teacher development and thorough planning to ensure that they are genuinely prepared to use formative assessment for assessing learning outcomes and students' progress.

The findings of this study are in line with previous research by (Zulaiha, Meldina, and Meisin 2022), which found that teachers face challenges in implementing formative assessment, which can influence students' learning outcomes. Furthermore, a study by (Laila M.K 2014) explains that formative assessment is crucial for assessing students' learning outcomes, including direct observation with proper preparation to monitor students' learning progress. To enhance the effectiveness of formative assessment in IPAS learning, efforts are needed to improve teachers' understanding and competence in designing and implementing formative assessment. Additionally, efficient time management and the provision of adequate resources to support the more effective implementation of formative assessment should also be considered. By addressing these challenges, it is expected that the implementation of formative assessment in IPAS learning can provide more optimal benefits in improving students' understanding, skills, and the application of knowledge in the field of IPAS.

Conclusion

The conclusion from this research is that the implementation of formative assessment in IPAS learning for fourth-grade students within the Independent Curriculum faces specific challenges and obstacles, making it not entirely effective. Despite fourth-grade teachers actively using various formative assessment instruments such as formative tests, observations, project assignments, and portfolios, there are several indicators that received low agreement from students. Indicators like the use of portfolios and project assignments, as well as the use of formative tests to measure understanding, showed relatively low agreement percentages.

Challenges and obstacles faced by fourth-grade teachers include a lack of understanding of the concept and methods of formative assessment, time constraints in evaluating students individually, and limitations in resources such as guidelines and adequate instructional materials. Integrating formative assessment into daily teaching practices is also a challenge, with some teachers struggling to manage assessment data and provide relevant feedback effectively.

To enhance the effectiveness of formative assessment in IPAS learning, training and guidance for teachers are necessary to improve their understanding and competence in designing and implementing formative assessments. Efficient time management and the provision of adequate resources should also be considered. By addressing these challenges, it is expected that the implementation of formative assessment can provide more optimal benefits in improving students' understanding, skills, and the application of knowledge in IPAS learning.

Overall, this research provides an overview of the implementation of formative assessment in IPAS learning for fourth-grade students within the Independent Curriculum. The results indicate that despite some challenges, formative assessment can still be used as an important strategy in enhancing IPAS learning. It is hoped that this research will contribute to the development of better teaching practices in the future.The conclusion should summarise the main state of play at the point of writing and consider the next steps. Summarise and conclude, restating the main argument and presenting key conclusions and recommendations—state how your findings/new framework can be applied in practice. Explain what the implications are for further research.

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There is no funding organization.

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Data availability statements provide a statement about where data supporting the results reported in a published article can be found - including, where applicable, hyperlinks to publicly archived datasets analyzed or generated during the study.

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The authors declare that they have no known competing financial interests or personal relationships that could have influenced the work reported in this paper. Alternatively, The authors declare the following financial interests/personal relationships, which may be considered as potential competing interests.

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