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Combining Collaborative Learning and Digital Formative Assessment within the Independent Curriculum

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Abstract

The Merdeka Curriculum was developed to meet the demands of 21st-century education by emphasizing flexible, student-centered, and contextually relevant learning. In this framework, collaborative learning and digital formative assessments serve as highly relevant and complementary strategies. Collaborative learning fosters the development of students' social and cognitive skills through interaction and teamwork, while digital formative assessments provide rapid, adaptive, and sustainable tools for monitoring and guiding learning. This study investigates the integration of these approaches through a literature review of scholarly articles. Findings indicate that combining collaborative learning with digital formative assessments enhances student engagement, teaching efficiency, and overall learning outcomes. Nevertheless, challenges such as disparities in digital literacy, limited infrastructure, and varying teacher competence in using technology must be addressed. These insights are expected to inform the design of more responsive, innovative, and adaptive learning policies and practices under the Independent Curriculum.

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1. Introduction

Recent changes in Indonesian education policy have introduced the Independent Curriculum as a new paradigm for the learning process. This curriculum was developed to address the demands of 21st-century education, which emphasize critical thinking, collaboration, creativity, and effective communication skills. The Independent Curriculum provides schools and teachers with the flexibility to design learning experiences that meet the specific needs of their students. A key feature of this approach is the emphasis on collaborative learning and the integration of digital technology in assessment practices. Collaborative learning focuses on student interaction to construct shared knowledge. This model not only enhances cognitive understanding but also cultivates essential social competencies, including tolerance, collective responsibility, and interpersonal skills, which are vital for functioning effectively in society.

Within the framework of the Independent Curriculum, a collaborative approach is particularly crucial, as it encourages students to actively problem-solve, share responsibilities, and work together on authentic, context-based projects. Hanipah (2022) highlights that collaborative learning enhances student participation and strengthens meaningful learning experiences. Meanwhile, digital formative assessments serve as a strategic tool to monitor individual student progress continuously. These assessments provide timely and frequent feedback, enabling teachers to adjust instructional strategies in real time. Unlike summative assessments, which evaluate final learning outcomes, formative assessments are diagnostic and ongoing. Digital platforms such as Google Forms, Kahoot, and Learning

Management Systems (LMS) have emerged as practical tools for conducting these assessments efficiently.

According to Wulandari et al. (2023), using Google Forms for formative assessments offers flexibility and efficiency in collecting data while facilitating the analysis of learning outcomes. The combination of collaborative learning and digital formative assessment adds substantial value to the implementation of the Independent Curriculum. This integration not only fosters interactive and contextually relevant learning experiences but also enables more personalized instruction through timely and accurate assessment data. Nugraha et al. (2023) highlight that teachers who effectively utilize digital assessments can develop learning strategies that are more responsive to individual student needs. Moreover, collaborative learning enhances students' capacity to tackle complex challenges collectively.

Despite its potential, the implementation of this integration in practice continues to face several challenges. Key obstacles include limited technological infrastructure in certain regions, unequal access to digital devices, and insufficient teacher training in utilizing digital assessment platforms. Additionally, a lack of awareness regarding the significance of formative assessments often impedes their systematic adoption. Consequently, ongoing literacy initiatives and continuous professional mentoring are necessary to ensure that this integration is implemented effectively and equitably. In light of these issues, this study seeks to explore how the integration of collaborative learning and digital formative assessment within the Independent Curriculum has been addressed in the scientific literature. Using a

literature review methodology, the research analyzes relevant scholarly articles to identify best practices, implementation challenges, and their implications for the development of future learning policies and instructional practices.

2. Literature Review

Collaborative learning is grounded in social constructivist theory, which posits that learning is most effective when students interact with one another to solve problems and construct meaning collectively. In practice, this approach encourages learners to actively share ideas, build knowledge together, and develop communication and empathy skills. Mustaqim et al. (2020) note that collaborative learning not only enhances academic performance but also fosters deeper student engagement in the learning process. This aligns with the principles of the Independent Curriculum, which emphasizes student-centered learning and the cultivation of the Pancasila Student Profile. Meanwhile, digital formative assessments represent a significant advancement in modern learning evaluation. Unlike summative assessments, formative assessments are ongoing and support the learning process by providing corrective feedback rather than punitive measures. The use of technologies such as Google Forms, LMS platforms, Kahoot, and Quizizz enables teachers to track students' progress in real time, allowing for timely adjustments to instruction.

Research by Adi et al. (2023) indicates that incorporating digital assessments can enhance assessment efficiency, reduce teachers' administrative workload, and help students gain a clearer understanding of their learning strengths and

weaknesses. The integration of collaborative learning with digital formative assessment holds strategic significance within the Independent Curriculum. Beyond promoting active student engagement, collaborative learning reinforces the role of formative assessments as informative and participatory diagnostic tools. Nugraha et al. (2023) emphasize that using digital assessments in a collaborative learning context accelerates the evaluation and improvement cycle, enabling teachers to implement timely and appropriate instructional interventions based on the data collected. Consequently, examining the integration of these two approaches is essential to determine how effectively and consistently they can be applied across Indonesian schools under the Independent Curriculum framework.

3. Method

This study employs a descriptive-qualitative literature review approach aimed at providing an in-depth examination of scientific literature concerning the integration of collaborative learning and digital formative assessment within the Independent Curriculum. The research involved a systematic search for scholarly articles using the Google Scholar database. The keywords applied during the search included "collaborative learning", "digital formative assessment", "Independent Curriculum", "digital education innovation", and "formative evaluation". The inclusion criteria for selecting articles were: (1) publication in indexed scientific journals; (2) coverage of one or both core topics, namely collaborative learning and digital formative assessment; (3) relevance to primary and secondary education in Indonesia; and (4) presentation of empirical data or conceptual frameworks suitable

for critical analysis. Articles focusing solely on general educational technology or not directly related to the Independent Curriculum were excluded from the review.

A total of 10 articles meeting the inclusion criteria were selected for detailed analysis. The analysis followed a thematic approach, categorizing the articles into key themes: (1) principles and practices of collaborative learning, (2) the role of digital formative assessment in the learning process, (3) the integration of these approaches within the Independent Curriculum, and (4) challenges in implementing such integration in schools. After defining the themes, each article was carefully reviewed to extract relevant findings, arguments, and recommendations. The validity and reliability of the sources were ensured through a strict selection of peer-reviewed articles published by reputable academic institutions. Additionally, cross-referencing and content triangulation were conducted to enhance data credibility. The synthesized results are intended to provide a comprehensive overview of current trends, practices, challenges, and opportunities related to the integration of collaborative learning and digital formative assessments, offering insights for effectively and sustainably supporting the implementation of the Independent Curriculum.

4. Results

The findings of this literature review indicate that integrating collaborative learning methods with digital formative assessments within the Independent Curriculum provides several positive contributions, including enhancing learning quality, fostering 21st-century skills, and enabling personalized learning experiences.

This study analyzed 10 scientific articles published between 2020 and 2023, retrieved from Google Scholar and meeting the established inclusion criteria. The analysis was organized around four key themes: (1) the role of collaborative learning in the Independent Curriculum, (2) the effectiveness of digital formative assessments in improving learning outcomes, (3) models for integrating collaborative learning with digital formative assessment, and (4) challenges and strategies for implementing this integration in educational practice.

Firstly, the literature highlights that collaborative learning holds a strategic position within the Independent Curriculum, particularly in enhancing students' social-emotional development, character formation, and higher-order thinking skills. Budiono et al. (2023) note that collaborative learning promotes active student interaction through project-based tasks, discussions, and the constructive resolution of social conflicts. This approach aligns closely with the principles of differentiation and project-based learning emphasized in the Independent Curriculum, as it engages students directly in the learning process and provides opportunities for contextual and meaningful learning experiences.

Mustaqim et al. (2020) further support these findings, noting that collaborative strategies in the classroom enable teachers to create more open, participatory, and flexible learning environments. In such settings, students transition from being passive recipients to active participants who contribute to shaping the direction and content of learning. This approach aligns directly with the Independent Curriculum's goal of fostering students' potential. Collaborative learning also helps cultivate students' sense of responsibility, leadership, and

empathy, which are essential components of the Pancasila Student Profile. In addition, digital formative assessments have been shown to enhance the effectiveness of teaching and learning processes. Wulandari et al. (2023) demonstrate that using tools such as Google Forms facilitates the efficient collection and analysis of student learning data, supporting timely instructional adjustments.

Moreover, these digital platforms enable teachers to provide prompt and targeted feedback, allowing students to identify and correct errors immediately. This supports an adaptive, reflective, and continuous improvement-oriented learning cycle. Similarly, Adi et al. (2023) highlight that digital assessments offer teachers flexibility in designing a variety of assessment formats, from multiple-choice quizzes to problem-solving and descriptive questions. Features such as automated scoring and statistical analysis of responses allow teachers to quickly evaluate student performance and plan subsequent instructional interventions. Additionally, Sari (2023) notes that digital assessments can be easily integrated with Learning Management Systems (LMS), enabling teachers to systematically store, monitor, and manage students' learning progress.

Thirdly, the findings indicate that integrating collaborative learning with digital formative assessment creates an effective, adaptive, and participatory learning model. In this approach, students collaborate in groups to complete teacher-designed tasks or projects, while their progress and understanding are continuously monitored through digital formative assessments. These assessments occur throughout the learning process rather than solely at the end, and their results serve as a basis for providing feedback and differentiating instruction. Kartono (2020)

reports that this strategy enhances students' intrinsic motivation and promotes a positive classroom learning culture. Similarly, Darwin et al. (2023) highlight that the integration of collaborative learning and digital formative assessment can significantly boost student engagement.

Within project-based learning, students actively participate in planning and executing activities, while teachers utilize digital formative assessments to continuously evaluate both group processes and outcomes. This approach allows teachers to assess not only the final products but also group interactions, individual contributions, and the achievement of learning objectives. The assessment results provide a basis for specific and actionable feedback, benefiting both teachers and students. Studies, including Hasanah et al. (2022), indicate that teachers employing digital formative assessments in collaborative learning are better able to identify students requiring additional support. Assessment data can be analyzed at both individual and group levels, enabling teachers to select the most suitable instructional strategies for each student. In practice, this may involve grouping students according to their mastery of the material, adjusting group dynamics, and guiding students to reflect on their learning process.

Fourthly, despite the numerous advantages, the implementation of this integrated approach still encounters several challenges in practice. A primary obstacle is limited access to technology and the internet, particularly in schools located in remote areas, which hinders equitable use of digital formative assessments. Additionally, not all teachers possess sufficient digital literacy to effectively develop and manage assessments on digital platforms. Hanipah (2021) notes that ICT

training for teachers remains minimal and unevenly distributed across Indonesia. Another significant challenge is the gap in teachers' understanding of formative assessment concepts. Many educators still perceive assessment as merely evaluating final outcomes rather than as an ongoing component of the learning process. Consequently, the use of digital formative assessments often becomes a procedural formality, rather than a tool for informing adaptive and responsive instructional strategies.

In many instances, the feedback provided to students remains general and lacks specificity, limiting its effectiveness in enhancing learning outcomes. To address these challenges, recommended strategies include ongoing teacher training and mentoring focused on designing collaborative learning activities and managing digital assessments. Furthermore, the government must ensure equitable access to digital infrastructure nationwide, including reliable internet connectivity, sufficient devices, and user-friendly online learning platforms. Strengthening collaboration among teachers, school leaders, parents, and the broader learning community is also essential to foster a supportive and sustainable educational ecosystem.

The findings of this literature review indicate that integrating collaborative learning with digital formative assessments within the Independent Curriculum significantly enhances adaptive, student-centered, and responsive learning. Instruction becomes more contextual and engaging, while assessments function as tools for reflection and guidance rather than solely as measures of achievement. This integration supports not only cognitive development but also character building, collaboration, and critical thinking skills. Consequently, the practice of combining

these approaches is considered valuable and should be further developed as a core component of the Independent Curriculum across all educational institutions. However, ensuring its success requires strong commitment from all stakeholders, including government policymakers, teachers as facilitators of learning, and students as active participants in the educational process.

5. Discussion

The integration of collaborative learning methods with digital formative assessments within the Independent Curriculum demonstrates a strong complementary relationship in addressing the demands of 21st-century education. Literature indicates that collaborative learning provides essential opportunities for developing students' soft skills, including communication, teamwork, empathy, and leadership. Meanwhile, digital formative assessments introduce innovations in evaluating learning by not only measuring achievement but also continuously monitoring and guiding students' progress in an adaptive manner. Within the Independent Curriculum framework, these approaches mutually reinforce each other: collaborative learning enhances the learning process, while formative assessment ensures the direction and quality of learning outcomes.

This discussion emphasizes that the collaborative approach functions not merely as a teaching method but as a guiding philosophy in the design of the Independent Curriculum. Teachers assume the role of facilitators, creating learning environments where students learn both from and alongside their peers. Within this framework, active student participation serves as a key measure of learning success.

This aligns with the principles of differentiated learning, which provide each student the opportunity to engage with content according to their individual learning style and pace.

Digital formative assessments, which offer real-time feedback and rapid analysis of learning data, serve as a highly strategic tool within collaborative learning. In practice, these assessments evaluate not only students' knowledge but also group processes, participation, and individual contributions. Using data from platforms such as Google Forms, Kahoot, or LMS, teachers can identify students facing challenges and promptly implement appropriate instructional interventions. Additionally, these assessments enable educators to design more responsive and evidence-informed learning strategies.

Nevertheless, the integration of collaborative learning and digital formative assessments faces several practical challenges. Variations in teachers' digital literacy, limited technological infrastructure, and constraints on time for lesson planning present significant obstacles. Evidence from multiple studies indicates that teachers often struggle to design formative assessments that are both meaningful and feasible, particularly when they lack familiarity with digital tools. Moreover, the persistence of teacher-centered classroom cultures can hinder the development of genuinely collaborative learning environments. To ensure successful implementation, comprehensive policies and systematic institutional support are essential.

going professional development for teachers is essential, particularly in designing technology-based collaborative learning activities and effectively utilizing formative assessment data. Governments and educational institutions should also

promote the establishment of professional learning communities, enabling teachers to share best practices and strategies for successful integration. Additionally, it is important to recognize that assessments are not merely tools for measuring outcomes, but instruments for guiding and enhancing the learning process itself. Consequently, collaborative learning and digital formative assessment are more than technical tools within the Independent Curriculum they represent a shift in the educational paradigm that positions students as active participants in their learning. Achieving this transformation requires support from an inclusive, adaptive, and innovative education system.

6. Conclusion

This literature review demonstrates that integrating collaborative learning methods with digital formative assessments within the Independent Curriculum represents a strategic approach to enhancing overall learning quality. Collaborative learning plays a significant role in developing students' critical thinking, cooperation, and active participation. It fosters more meaningful and contextual learning experiences aligned with the principles of differentiation central to the Independent Curriculum. Meanwhile, digital formative assessments enable teachers to track student progress in real time, provide timely and targeted feedback, and adjust instructional strategies based on the assessment data collected.

The combination of collaborative learning and digital formative assessments creates a learning model that is adaptive, participatory, and data-informed. This integration allows teachers to design instruction that emphasizes not only content

mastery but also collaborative processes and values essential for shaping students' character as Pancasila Students. Nevertheless, the effectiveness of this approach largely depends on teachers' readiness, the availability of digital infrastructure, and comprehensive policy support. Consequently, ongoing and systematic efforts are necessary to enhance teacher competence, expand access to educational technology, and cultivate a learning ecosystem that fosters innovation. The findings of this study are intended to provide a foundation for developing educational policies and practices that are more transformative and responsive to contemporary learning needs.

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