Formative assessment for learning achievement: A systematic review

Evaluación formativa para el logro de los aprendizajes: una revisión sistemática

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Abstract

The aim of this article was to analyze the role of formative assessment in learning achievement. To this end, the PRISMA methodology was used in a systematic review of scientific literature. The inclusion criteria considered keywords in Spanish and English such as “formative evaluation” AND “learning,” and the Scopus and Scielo databases were consulted, prioritizing open-access articles published between 2020 and 2025. Publications prior to 2020, paid documents, books, and theses were excluded. The selection process yielded a total of 268 articles initially identified, of which 21 were finally analyzed (8 from Scopus and 13 from Scielo). The results show that formative assessment is becoming an essential component for promoting effective learning, surpassing its traditional conception as a mere grading tool. The urgency of strengthening it as a continuous tool for support and feedback that promotes the comprehensive development of students is highlighted. Likewise, students positively value well-designed curricular experiences that are capable of generating meaningful learning even in adverse contexts. For a more accurate assessment, the use of analytical rubrics and scales focused on the formative experience is recommended, which require clear didactic planning aligned with learning outcomes. Finally, methodologies such as cooperative learning and project-based learning, articulated with student-centered instruments, allow for effective integration between curriculum, teaching, and assessment.

Keywords: formative assessment, learning, strategies.

Resumen

El presente artículo tuvo como objetivo analizar el rol de la evaluación formativa en el logro de los aprendizajes. Para ello, se empleó la metodología PRISMA en una revisión sistemática de literatura científica. Los criterios de inclusión consideraron palabras clave en español e inglés como “formative evaluation” AND “learning”, y se consultaron las bases de datos Scopus y Scielo, priorizando artículos de acceso abierto publicados entre los años 2020 y 2025. Se excluyeron publicaciones anteriores a 2020, documentos de pago, libros y tesis. El proceso de selección arrojó un total de 268 artículos identificados inicialmente, de los cuales se analizaron finalmente 21 (8 de Scopus y 13 de Scielo). Los resultados evidencian que la evaluación formativa se consolida como un componente esencial para potenciar el aprendizaje efectivo, superando su concepción tradicional como mero instrumento de calificación. Se destaca la urgencia de fortalecerla como una herramienta continua de acompañamiento y retroalimentación, que favorezca el desarrollo integral del estudiante. Asimismo, los estudiantes valoran positivamente aquellas experiencias curriculares bien diseñadas, capaces de generar aprendizajes significativos incluso en contextos adversos. Para una evaluación más precisa, se recomienda el uso de rúbricas analíticas y escalas centradas en la experiencia formativa, las cuales requieren una planificación didáctica clara y alineada con los resultados de aprendizaje. Finalmente, metodologías como el aprendizaje cooperativo y el aprendizaje basado en proyectos, articuladas con instrumentos centrados en el estudiantado, permiten una integración efectiva entre currículum, didáctica y evaluación.

Palabras clave: evaluación formativa, aprendizaje, estrategias.

Introduction

Educational assessment plays a fundamental role as a mechanism for monitoring and guiding the learning process, constituting an essential component of teaching practice. Its purpose is not only to verify the achievement of expected learning outcomes but also to provide students with the opportunity to demonstrate their knowledge, skills, and competencies developed during each educational experience. A well-designed assessment contributes to strengthening critical thinking, creativity, and student autonomy (Ndlovu, 2025).

However, tensions persist between educational policies and classroom realities, revealing a structural disconnect that hinders the implementation of authentic assessment practices. The lack of a clear institutional framework and effective recognition by the system may lead educators to perceive these strategies as bureaucratic burdens rather than valuable pedagogical opportunities for learning (Warbrick, 2022).

Additionally, the prevalence of traditional evaluative models, which focus on content reproduction and quantitative performance, complicates the adoption of more formative, inclusive, and contextualized approaches. This situation necessitates a critical review of current assessment practices, as well as their alignment with pedagogical principles that promote the holistic development of students, reflection, and meaningful learning (Ramírez et al., 2025).

In this context, the collaboration between universities and schools in teacher training also faces significant challenges. These include a shortage of mentors with effective pedagogical practices, weak connections between training institutions and educational centers, and an accreditation system that evaluates formalities more than substantive processes. This disconnect limits the strengthening of an evaluative culture focused on the professional development of teachers (Dávila et al., 2025).

In the Peruvian case, while the importance of utilizing diverse resources to collect evidence of learning and assess student performance is recognized, as well as the establishment of empathetic communication that motivates students, these conditions are not always guaranteed in practice, which weakens the transformative potential of assessment (Falcón et al., 2021).

On the other hand, the competency-based approach (CBA), which positions the student as the protagonist of their learning process, aims to foster collaborative work, real problem-solving, and timely teacher support. However, when its implementation lacks a solid pedagogical foundation, it risks being reduced to fragmented or decontextualized tasks, thereby limiting its formative capacity (Quiñones et al., 2021).

In this framework, the present study aimed to analyze the implications of formative assessment in improving learning, recognizing its potential as a continuous tool for feedback and pedagogical support.

Methodology

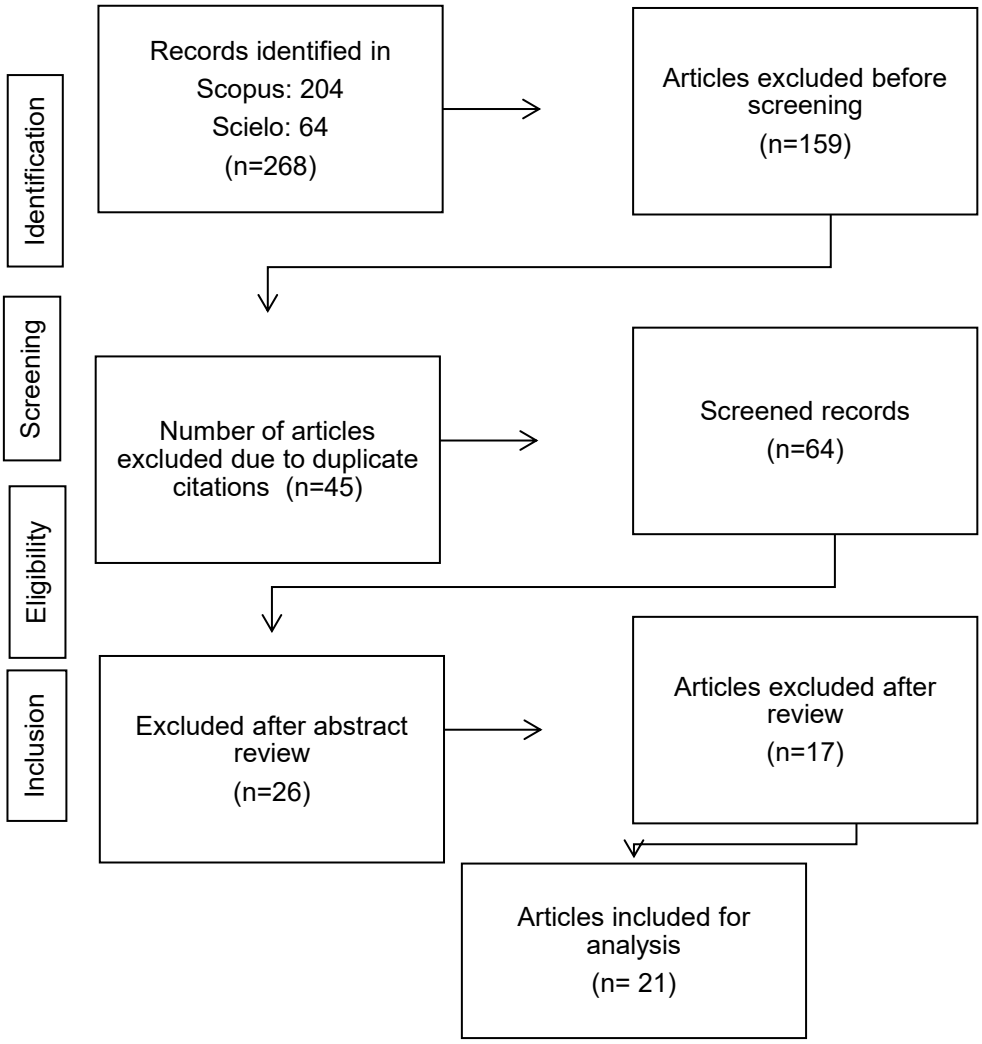
This study was developed using a systematic review methodology, following the guidelines of the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) model. For the inclusion criteria, keywords in both Spanish and English were utilized: “formative evaluation” AND “learning,” which allowed for the identification of relevant studies on formative assessment in the learning process. The search was conducted in the databases Scopus and SciELO, chosen for their open access to articles in both English and Spanish. The search equation employed the Boolean operator AND, limiting the publication period to the years 2020 to 2025. Regarding the exclusion criteria, articles published before 2020, restricted access studies (paid or closed), as well as books, theses, and other non-peer-reviewed sources were discarded. As a result of the selection process, a total of 268 articles were identified. Of these, 8 articles were from the Scopus database and 13 from SciELO, resulting in a total of 21 studies analyzed in depth for this review (see Table 1).

Table 1

Search keywords for database articles

Database	Search term	Results	Selected
Scopus	“formative evaluation” AND “learning”	204	8
Scielo	“formative evaluation” AND “learning”	64	13
	Total	268	21

Figure 1
PRISMA flow diagram



* Table formatted according to PRISMA with original data.

Results and discussion

Table 2
Implications of formative assessment for achieving learning outcomes

N	Author	Implications of scientific inquiry for learning
1	Sandoval & Seguel (2025).	The implementation of active methodologies, such as case analysis combined with gamification strategies, proves to be an effective approach for improving both academic performance and student motivation. The use of tools such as analytical rubrics and formative experience scales allows for more precise assessment of achieved learning, emphasizing the importance of clear instructional planning aligned with learning outcomes.

2	Vera-Sagredo & Cuvili (2024).	While educators value transparency and show openness to more reflective and inclusive evaluative practices, there remains a concern regarding the centrality of grades, which may limit the formative focus. This highlights the need to strengthen assessment as a tool for supporting learning rather than merely verifying results.
3	Seguel-Arriagada et al. (2024).	Active methodologies, such as cooperative and project-based learning, combined with student-centered evaluative tools, allow for the integration of curriculum, pedagogy, and assessment. This configuration not only enhances academic performance but also fosters a meaningful formative experience aimed at the personal and professional development of students.
4	Añazco (2024).	Collaborative teaching and interdisciplinary approaches, supported by active methodologies such as project-based learning and the use of educational technologies, enable the implementation of formative assessment strategies that promote continuous feedback and curricular integration. However, there is a need to expand these innovative experiences in school contexts.
5	Pascual-Arias & López-Pastor (2024).	The development of teacher training seminars focused on Formative and Shared Assessment, through cycles of action-research, facilitates the transformation of evaluative practices, enhances teachers' research competencies, and contributes to a culture of critical reflection and sustained pedagogical innovation.
6	Cárdenas-Rogel et al. (2024).	The incorporation of digital tools like Kahoot in formative assessment processes promotes greater student participation and improves learning in areas such as Natural Sciences, demonstrating that ICT can be effective allies in active teaching strategies.
7	Bustos-Moyano et al. (2024).	The combination of educational podcasts and artificial intelligence, such as ChatGPT, emerges as an innovative strategy for formative assessment, allowing for contextualized and relevant feedback in the development of professional reasoning in fields such as Kinesiology, especially in the post-pandemic educational scenario.
8	Maldonado-Fuentes (2024).	Recognizing formative assessment as an object of teacher knowledge is essential to ensure quality education. The study reveals that future teachers have a limited command of specialized language in educational assessment, highlighting the need to strengthen their literacy in evaluation from initial training.
9	Paucar & Álvarez (2024).	Formative assessment, applied through strategies such as group activities and focus groups, fosters the development of critical and reflective thinking while requiring active student participation. These practices allow for adjustments in teaching to better align with learning processes, reinforcing their effectiveness.
10	Álvarez & Jiménez (2024).	The active participation of students in their own evaluation processes, combined with effective teacher feedback, promotes deeper and more lasting learning in higher education. Strategies such as self-assessment, collaborative error review, and improvement seeking based on feedback are emphasized.
11	Tantalean & Aguirre (2024)	Students positively valued the development of skills such as creativity, leadership, and theoretical-practical application, demonstrating that well-designed curricular experiences can promote effective learning even in adverse contexts.

12	Peungcharoenkun, & Waluyo (2024).	The combination of written and oral feedback, especially through digital platforms, proves effective in providing more precise and efficient comments, although there is also a need to maintain personalized interaction. This underscores the importance of balancing different feedback modalities according to student needs.
13	Llerena-Espinoza et al. (2024).	The systematic review confirms that rubrics, applied in virtual environments, promote a more objective and effective formative assessment, fostering autonomous and reflective learning as well as competency development. Their increasing use across various educational levels highlights their value as a strategy to guide student performance and encourage active participation in the assessment process.
14	Wondim & Dessie (2024).	Effective implementation of continuous assessment in higher education requires teacher training and clear institutional standards, as its application, limited methods, and low student participation hinder its formative function. This underscores the need to strengthen both teaching and structural capacities so that assessment genuinely contributes to learning.
15	Matovu et al. (2022).	The use of immersive virtual reality (IVR) in science education has proven effective in motivating and engaging students, especially by facilitating the visualization of abstract concepts. However, learning outcomes vary, and effectiveness depends on careful alignment between the characteristics of immersive design and pedagogical goals. This highlights the need to integrate learning theories into the planning and evaluation of these experiences.
16	Oyetade & Harmse (2024)	Educational hackathons promote collaborative work, skill development, and greater student motivation, generating positive impacts on learning. However, their implementation faces challenges such as cultural diversity and resource availability. Strategic integration represents a significant opportunity to adapt education.
17	Nogueira de Vasconcelos et al. (2025).	Formative interventions applied in the agricultural field, through the Change Laboratory approach, allowed participants to broaden their understanding of issues from a systemic and historical perspective, promoting critical reflection, transformative action, and the design of sustainable solutions. These strategies proved effective in fostering significant learning and changes in how agriculture is conceived and practiced.
18	Caspari-Sadeghi (2022).	The use of Learning Analytics (LA) in higher education during the pandemic revealed a significant increase in the generation and analysis of educational data, enabling key functions such as monitoring, automated feedback, prediction, early intervention, and the design of new assessment forms. However, the lack of adequate computational infrastructure and human capacities limits full adoption and scalability, posing a significant challenge for educators and institutions.
19	Wakid et al. (2024).	The learning-oriented assessment (LoA) approach presents itself as a comprehensive strategy that enhances student learning by evaluating competencies in a relevant and practical manner, particularly in vocational education. Its implementation encompasses multiple modalities, including digital, collaborative, and project-based environments, aligning with current workforce demands. Furthermore, LoA fosters the development of critical skills.

20	Almeqdad et al. (2023)	UDL principles, applied in both K-12 and higher education, significantly improve learning outcomes, especially when applied in interventions targeted at students and in specific areas of study. However, variability in studies indicates the need for more homogeneous research to strengthen the evidence.
21	Pitso (2023).	Teaching history and learning in the post-pandemic context require transcending traditional theories such as behaviorism, adopting emerging approaches like the Non-Affirmative Theory of Education (NATE) and telagogy, which promote asynchronous, socially just education centered on student autonomy. The use of artificial intelligence systems, such as ChatGPT, facilitates learning by reducing time spent on tasks and stimulating creativity, suggesting a transition toward more productive thinking in higher education.

Importance of formative assessment for achieving learning outcomes

Formative assessment has established itself as a key element in enhancing effective learning, transcending its traditional role as a grading instrument. Although educators value transparency in evaluative processes and show openness to more reflective and inclusive practices, concerns persist regarding the centrality of grades. This situation may restrict the full application of the formative approach and limit its impact on the learning process (Vera-Sagredo et al., 2024). Thus, there is an urgent need to strengthen assessment as a continuous tool for support and feedback, aimed at the holistic development of the student.

In this context, recognizing formative assessment as a specific body of knowledge for educators is fundamental to ensuring quality education. However, various studies have shown that future teachers possess a limited command of the specialized technical language in educational assessment, highlighting the need to enhance their assessment literacy from initial training (Maldonado-Fuentes, 2024). This type of training is crucial for pre-service teachers to design and implement evaluative strategies that effectively contribute to learning progress.

From the students' perspective, formative assessment is highly valued for its ability to foster the development of transversal competencies such as creativity, leadership, and the theoretical-practical application of knowledge. Students positively highlight well-designed curricular experiences that can promote meaningful learning even in adverse contexts (Tantalean et al., 2024). This recognition from students reinforces the importance of structuring evaluative processes that integrate both content acquisition and the development of essential skills for academic and professional life.

Nonetheless, the effective implementation of continuous assessment in higher education still faces significant challenges. Recent research indicates that poorly executed practices, limited use of diverse methods, and low student participation can hinder the achievement of formative objectives. Therefore, there is an emphasis on the need to strengthen teacher training and establish clear institutional standards that guide assessment towards meaningful practice. In this sense, assessment should be conceived and applied as an integral process capable of fostering active participation and student commitment to their own learning (Wondim et al., 2024).

Finally, the post-pandemic context has created an opportunity to question and rethink traditional pedagogical approaches, such as behaviorism, and advance towards models based on emerging theories that promote social justice and student autonomy. In this new scenario, the integration of advanced technologies—like artificial intelligence systems such as ChatGPT—represents a powerful tool that can optimize learning by reducing task execution times and enhancing student creativity. This suggests the need to move towards more productive, critical, and student-centered educational models (Pitso, 2023).

Strategies for formative assessment to achieve learning outcomes

The implementation of active methodologies, such as case analysis combined with gamification strategies, has proven effective in improving both academic performance and student motivation. To assess the learning achieved more accurately, it is essential to use tools such as analytical rubrics and scales focused on the formative experience, which require clear instructional planning aligned with learning outcomes (Sandoval et al., 2025). Moreover, methodologies like cooperative learning and project-based learning, accompanied by tools oriented toward the student experience, enable effective articulation of curriculum, pedagogy, and assessment. This not

only enhances academic performance but also promotes a meaningful formative experience aimed at personal and professional development (Seguel-Arriagada et al., 2024).

Collaborative teaching and interdisciplinary approaches, grounded in active methodologies and the use of educational technologies, facilitate the implementation of formative assessment strategies that promote continuous feedback and curricular integration. However, there is a need to expand these innovative experiences in school contexts to maximize their impact (Añazco, 2024). In this regard, the development of teacher training seminars focused on Formative and Shared Assessment, through cycles of action-research, contributes to transforming evaluative practices, strengthens teachers' research competencies, and consolidates a culture of critical reflection and sustained pedagogical innovation (Pascual-Arias et al., 2024).

The incorporation of digital tools like Kahoot in formative assessment processes enhances student participation and improves learning, particularly in areas such as Natural Sciences, demonstrating that ICT can be effective allies in active teaching strategies (Cárdenas-Rogel et al., 2024). Innovatively, the combination of educational podcasts with artificial intelligence, such as ChatGPT, emerges as an emerging strategy that allows for contextualized and pertinent feedback, supporting the development of professional reasoning, especially in post-pandemic scenarios (Bustos-Moyano et al., 2024).

Strategies that promote active student participation—such as group activities and focus groups—strengthen critical and reflective thinking while requiring direct involvement from students. These practices allow for continuous adjustments in teaching to align with learning processes and increase effectiveness (Paucar et al., 2024). Additionally, encouraging students to participate in their own evaluative processes, along with effective teacher feedback, fosters deeper and more sustainable learning. Strategies such as self-assessment, collaborative error review, and seeking improvements based on feedback are particularly valuable in this regard (Álvarez et al., 2024).

The balance between written and oral feedback—especially through digital platforms—enables the provision of more precise and efficient comments; however, it is essential to maintain personalized interaction to address the individual needs of students. This highlights the importance of combining different feedback modalities to optimize learning (Peungcharoenkun et al., 2024). Additionally, the use of rubrics in virtual environments supports objective and effective formative assessment, stimulating autonomous and reflective learning, as well as competency development. Their increasing implementation across various educational levels confirms their value as a guide for performance and as a tool to encourage active participation in the evaluative process (Llerena et al., 2024).

The use of emerging technologies, such as immersive virtual reality (IVR), has proven to be a motivating tool in science education by facilitating the visualization of abstract concepts. However, its effectiveness depends on proper alignment between the immersive design and pedagogical goals, underscoring the need to integrate learning theories into the planning and evaluation of these experiences (Matovu et al., 2022). Likewise, educational hackathons promote collaborative work, skill development, and student motivation. Although their implementation faces challenges related to cultural diversity and resource availability, they represent a valuable opportunity to adapt education to diverse contexts (Oyetade et al., 2024).

In specific contexts such as agriculture, formative interventions based on the Change Laboratory approach have allowed participants to broaden their understanding of issues from systemic and historical perspectives, promoting critical reflection, transformative action, and the design of sustainable solutions. These strategies demonstrate their potential to generate meaningful learning and transformations in professional practices (Nogueira de Vasconcelos et al., 2025). On the other hand, the application of Learning Analytics in higher education during the pandemic facilitated the generation and analysis of educational data, enabling monitoring, automated feedback, prediction, and early intervention. However, full adoption faces limitations due to a lack of infrastructure and technical capacities, which poses a challenge for both educators and institutions (Caspari-Sadeghi, 2022).

Finally, the learning-oriented assessment (LoA) approach emerges as a comprehensive strategy that enhances student learning through practical and contextualized evaluation of competencies, especially in vocational education. Its implementation through digital, collaborative, and project-based modalities addresses the current labor market demands and fosters the development of critical skills (Wakid et al., 2024). Concurrently, the application of Universal Design for Learning (UDL) principles, both in K-12 and higher education, has been shown to improve learning outcomes, particularly when interventions target specific students and areas of study. Nevertheless, the methodological heterogeneity of existing studies suggests the need for continued research to consolidate evidence of its effectiveness (Almeqdad et al., 2023).

Conclusions

The study concludes that formative assessment positions itself as a key element in enhancing effective learning, transcending its role as a mere grading instrument. There is an urgent need to strengthen assessment as a continuous tool for support and feedback that facilitates the holistic development of the student. In this regard, the necessity of training educators and establishing clear institutional standards is emphasized so that assessment can genuinely contribute to learning. Assessment should be conceived and applied as an integral process that fosters active participation.

Given that students positively value well-designed curricular experiences, which can promote meaningful learning even in adverse contexts, the use of tools such as analytical rubrics and formative experience scales is fundamental for accurately assessing achieved learning. Clear instructional planning aligned with learning outcomes is essential. Finally, methodologies such as cooperative and project-based learning, accompanied by student-centered tools, effectively articulate curriculum, pedagogy, and assessment.

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