

## **EFFECTS OF FORMATIVE ASSESSMENT ON COMPETENCY DEVELOPMENT**

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**Abstract:** The purpose of this study is to explore how formative assessment impacts the development of competencies in science and technology. Assessment plays a vital role in bridging instruction and learning. Although it appears in multiple formats, its primary role is to determine how much knowledge and understanding students have gained during a lesson or series of lessons. William (2010) emphasizes that assessment is a key element of successful teaching, as it is the only way to confirm whether students have comprehended the material. Formative assessment, in particular, is an ongoing process that occurs alongside learning, aiming to track and enhance student performance. Hattie (2012) highlights that this type of assessment responds to individual student needs and significantly contributes to educational progress. Despite strong support for the benefits of formative assessment, certain aspects still require deeper research.

**Keywords:** learning analysis, self-regulation, primary education, academic achievement, metacognition

### **Introduction**

One area that requires further investigation is the impact of formative assessment on the acquisition of scientific and technological competencies. Although existing research has addressed this topic, gaps remain—particularly in relation to implicit theories of learning and the challenges educators face in integrating formative assessment into everyday teaching practices. Moreover, there is a notable lack of intercultural research on the planning and implementation of formative assessment in classroom settings, especially in under-explored regions such as Peru. This country, as noted by Beriche and Medina (2021), Fernández et al. (2022), and Mollo and Medina (2020), remains among the least studied national contexts concerning formative assessment.

Black and Wiliam (2009) draw a crucial distinction between formative and summative assessment, emphasizing the formative aspect as being "in process." Formative assessment is conducted before or during instruction and is intended to inform teaching strategies and better address student needs. In contrast, summative assessment takes place at the end of an instructional period and is concerned solely with evaluating what has been learned, without influencing instructional decisions or adapting to student needs.

Black and Wiliam also identify five key components of effective formative assessment:

1. **Clarifying learning intentions and success criteria** – Clearly communicating what students are expected to learn and how their success will be measured.
2. **Designing discussions and tasks** – Creating learning activities that generate evidence of student understanding.
3. **Providing constructive feedback** – Delivering feedback that helps students progress and refine their understanding.
4. **Engaging students with meaningful learning resources** – Using tools and materials that align with students' evolving learning needs.
5. **Fostering self-regulated learning** – Encouraging students to take ownership of their learning process.

These components highlight the ongoing and responsive nature of formative assessment, in contrast to the finality and retrospective focus of summative assessment. It is insufficient to merely deliver content; formative assessment also requires the intentional sharing of metacognitive strategies that help students master that content. Students must learn to evaluate their own work using both personal and teacher-defined criteria, develop efficient study methods, manage their time and effort effectively, and become aware of their own knowledge and learning needs.

Teaching and learning are best understood as processes of regulation and self-regulation. Teacher regulation involves adapting instruction based on observed student needs and difficulties, while self-regulation refers to students developing and refining personal learning strategies over time. In this model, students are encouraged to become autonomous learners, engaging in metacognitive behaviors to guide and improve their learning.

Assessment, therefore, serves multiple functions: it supports students by revealing their progress and challenges, helps them become more aware of their learning, and guides instructional decisions. Teachers should foster learning environments that encourage social interaction and mutual regulation—where students learn with and from one another. Metacognitive awareness grows with maturity and includes the ability to consciously direct learning, recognize and correct mistakes, transfer knowledge across contexts, and adapt learning behaviors.

From a policy perspective, formative assessment as a process of recognizing and reinforcing student learning as it occurs. Cognitively, it involves understanding the mental strategies students use to reach learning goals. Drawing from socio-cultural theory, particularly Vygotsky's (1978) concept of the zone of proximal development, formative assessment aims to identify not only what students know but also what they are capable of learning with guidance, including recognition of potential errors.

Sanmartí (2010) emphasizes that formative assessment is a process of gathering and analyzing information to inform decision-making in both teaching and learning. He argues against the traditional view of the teacher as the sole regulator, advocating instead for strategies that promote student self-regulation—making metacognition a central dimension of formative assessment. In societies where grading is deeply entrenched, promoting metacognitive growth is essential to help students become autonomous learners. However, metacognitive abilities do not develop on their own. As Pozo and Mateos (2009) argue, these skills must be explicitly taught, enabling students to plan, monitor, and evaluate their own use of knowledge. Achieving this requires intentional instructional and assessment strategies designed to promote independent, reflective learning.

### **CONCLUSIONS**

Formative assessment predicts the degree of development of scientific and technological competencies in school education. The robust validation of all four hypotheses through hypothesis testing unequivocally supports the effectiveness of formative assessment in enhancing learning outcomes. This becomes particularly impactful when combined with transparent performance criteria and shared improvement strategies, significantly contributing to the overall learning experience.

### **Used literature:**

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