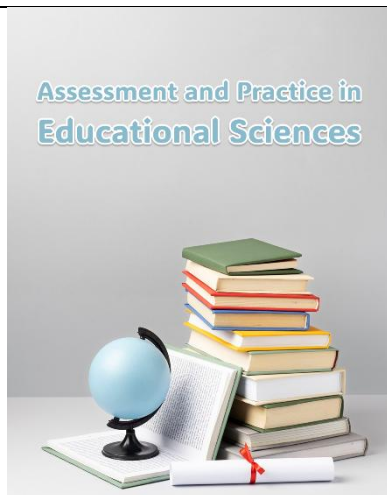




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Conceptual Dimensions of Formative Assessment as Perceived by Curriculum Designers

ABSTRACT

This study aimed to explore the conceptual dimensions of formative assessment as perceived by curriculum designers, focusing on their interpretations, challenges, and strategies within the context of curriculum development. A qualitative research design was employed using semi-structured interviews with 16 curriculum designers based in Tehran. Participants were selected through purposive sampling based on their expertise in curriculum planning and assessment. Interviews continued until theoretical saturation was reached, ensuring depth and variation in the data. Transcripts of the interviews were analyzed thematically using NVivo software, with open coding leading to the development of subthemes and overarching categories. Three main thematic categories emerged from the data: (1) pedagogical foundations of formative assessment, (2) implementation challenges and contextual barriers, and (3) strategic approaches to effective practice. Participants emphasized the role of formative assessment in supporting learning processes, fostering learner autonomy, and aligning with constructivist principles. However, systemic obstacles such as institutional constraints, teacher readiness, and policy misalignment were identified as major barriers. Strategic solutions proposed by curriculum designers included enhanced professional development, collaborative curriculum design, and the integration of technology. The findings underscored the need for a cultural and structural shift to effectively embed formative assessment into curriculum frameworks. Curriculum designers hold nuanced and pedagogically grounded conceptions of formative assessment, viewing it as a dynamic and learner-centered process. However, translating these conceptions into practice remains challenging due to systemic and contextual limitations. Addressing these challenges requires multi-level interventions including policy reform, professional development, and curriculum innovation aimed at creating a sustainable culture of formative assessment.

Keywords: Formative assessment, curriculum design, qualitative research, educational assessment, curriculum policy, feedback, assessment culture

Introduction

In recent decades, formative assessment has become a cornerstone of effective teaching and learning, recognized not only as a mechanism for evaluating student performance but also as a dynamic process integral to the instructional cycle (Black & Wiliam, 1998). As educational paradigms shift from traditional knowledge transmission to constructivist, learner-centered models, formative assessment is increasingly valued for its potential to promote deeper understanding, critical thinking, and lifelong learning competencies (Heritage, 2010; Andrade & Cizek, 2010). This shift has significant implications for curriculum designers, who are tasked with embedding formative principles into instructional frameworks while addressing systemic constraints, policy pressures, and pedagogical challenges.

Formative assessment is commonly defined as any activity that provides information used as feedback to modify teaching and learning while the learning is still ongoing (Sadler, 1989). Unlike summative assessments, which are typically used to evaluate learning outcomes at the end of an instructional unit, formative assessments are implemented throughout the learning process with the aim of enhancing learning as it occurs (Black & Wiliam, 2009). These include practices such as questioning, feedback, peer- and self-assessment, and observation (Wiliam, 2011). According to Brookhart (2007), the success of formative assessment depends not only on the tools used but also on the clarity of learning goals, the responsiveness of instruction, and the capacity of learners to reflect on their own progress. Given these complexities, the perspectives of curriculum designers—those responsible for structuring the learning environment—play a critical role in shaping formative practices at the systemic level.

The literature demonstrates a growing interest in the alignment between curriculum development and formative assessment. For instance, Clarke (2014) highlights that effective curriculum design requires coherence between assessment tasks, instructional strategies, and learning objectives. Yet, despite the theoretical appeal of formative assessment, empirical studies show that it is often poorly implemented or misunderstood in practice (Looney, 2005). Part of this disconnect stems from the conceptual ambiguity surrounding formative assessment and the variability in how it is interpreted across educational contexts (Bennett, 2011). While some practitioners view it narrowly as frequent testing, others consider it a broad pedagogical approach involving feedback loops, self-regulation, and dialogic learning (Carless, 2007). This diversity of interpretations suggests the need to explore how key educational stakeholders, particularly curriculum designers, conceptualize formative assessment in theory and in practice.

Curriculum designers are uniquely positioned to influence how assessment principles are operationalized in educational settings. Their perceptions of formative assessment determine how learning goals are articulated, how assessment tasks are integrated into the curriculum, and how instructional guidelines are framed for teachers (Kelly, 2009). However, much of the existing research on formative assessment has focused on teachers' practices and beliefs (Popham, 2008), with limited attention paid to the voices of curriculum designers. This gap in the literature is particularly concerning given that curriculum frameworks provide the foundation upon which classroom assessments are built. Understanding how curriculum designers perceive formative assessment is therefore critical to advancing both theory and practice.

Internationally, policy reforms have increasingly emphasized formative assessment as a mechanism for improving educational quality and equity. For example, the Organisation for Economic Co-operation and Development (OECD, 2005) has promoted formative assessment as a key strategy for addressing learning disparities and supporting personalized instruction. In many national contexts, including Iran, educational authorities have initiated curriculum reforms aimed at integrating formative principles into teaching practices (Nassaji & Moinszadeh, 2011). Yet the implementation of such reforms has proven difficult, often due to misalignment between assessment policies, institutional cultures, and teacher preparedness (Azarbarzin & Ebrahimi, 2021). Curriculum designers, operating at the intersection of policy and pedagogy, are critical agents in resolving these tensions, but their role remains underexplored in both local and global scholarship.

Moreover, formative assessment is not merely a technical process but a deeply conceptual and context-dependent practice. As Torrance and Pryor (2001) argue, it involves complex judgments about student learning, requiring a strong understanding of pedagogical principles, curriculum theory, and learner diversity. Curriculum designers must grapple with multiple conceptual dimensions of formative assessment, including its diagnostic, motivational, and instructional functions (Harlen & James, 1997). They must also consider how cultural attitudes, systemic barriers, and resource constraints shape its implementation. These conceptual and practical challenges underscore the need for research that delves into the nuanced understandings held by those who craft curriculum structures.

From a theoretical perspective, formative assessment is grounded in sociocultural theories of learning, particularly the work of Vygotsky (1978) on the zone of proximal development. According to this view, learning is most effective when assessment provides timely feedback that mediates learners' development toward more complex levels of understanding. The role of curriculum designers, therefore, is not only to establish learning goals and materials but also to create conditions in which formative processes can flourish. This includes articulating clear assessment criteria, designing scaffolded tasks, and promoting learner autonomy (Nicol & Macfarlane-Dick, 2006). However, these tasks are complicated by real-world factors such as exam-driven educational systems, lack of teacher training, and cultural expectations about grading (Rea-Dickins, 2007).

Recent qualitative studies have begun to unpack some of these issues. For instance, Yin et al. (2014) found that curriculum leaders often struggled with reconciling formative practices with high-stakes accountability measures. Similarly, a study by Harris and Brown (2013) revealed that curriculum designers in New Zealand experienced tensions between promoting formative approaches and adhering to policy mandates. These findings suggest that the success of formative assessment reform depends not only on teacher behavior but also on the conceptual clarity and contextual sensitivity of curriculum designers. In environments where formative assessment is seen merely as a policy requirement rather than a pedagogical philosophy, its transformative potential is limited.

In the context of Iran, research on formative assessment remains limited, and much of the discourse has focused on implementation at the classroom level. A study by Riazi and Razavipour (2011) highlighted challenges Iranian educators face in balancing formative practices with centralized exams. Yet few studies have examined the perceptions of those who design curriculum policies and materials. Given the centrality of curriculum design to the operationalization of assessment practices, this gap limits our understanding of how formative assessment is conceptualized and implemented in practice.

This study aims to address this gap by exploring the conceptual dimensions of formative assessment as perceived by curriculum designers in Tehran. Using a qualitative approach grounded in semi-structured interviews, the study seeks to identify how curriculum designers define, interpret, and engage with formative assessment in their professional roles. Specifically, it investigates the pedagogical foundations, contextual barriers, and strategic approaches that inform their understanding and implementation of formative assessment. The insights generated from this research can inform more coherent curriculum policies, enhance professional development initiatives, and ultimately contribute to more effective and equitable educational practices.

Methods and Materials

Study Design and Participants

This study adopted a qualitative research design to explore the conceptual dimensions of formative assessment as perceived by curriculum designers. A purposive sampling strategy was employed to recruit participants who were directly involved in curriculum development at various educational levels. A total of 16 participants were selected from educational institutions and curriculum development centers located in Tehran. Participants were chosen based on their expertise in curriculum design, ensuring a diverse range of perspectives and experiences relevant to formative assessment. Data collection continued until theoretical saturation was achieved, meaning that no new significant themes emerged from the interviews, and the data were considered sufficiently rich to address the research questions.

Data Collection

Data were gathered through semi-structured interviews, allowing for in-depth exploration while maintaining flexibility to probe emerging ideas. An interview guide was developed, consisting of open-ended questions focused on participants' understanding, interpretation, and practical experiences with formative assessment in curriculum design. Each interview lasted approximately 45 to 60 minutes and was conducted in a setting convenient for the participants, either in person or via secure online platforms. All interviews were audio-recorded with the participants' consent and transcribed verbatim to ensure accuracy and completeness of the qualitative data.

Data analysis

The transcribed interviews were analyzed using thematic analysis, facilitated by NVivo software. This approach enabled systematic coding and categorization of the data into themes and subthemes. The coding process involved multiple readings of the transcripts, open coding to identify initial concepts, and axial coding to group similar codes under broader thematic categories. Constant comparison techniques were used throughout the analysis to refine categories and ensure internal consistency. The final themes were developed through iterative reflection and validation by the research team, aiming to faithfully represent the participants' perspectives on formative assessment within curriculum design.

Findings and Results

Category 1: Pedagogical Foundations of Formative Assessment

Emphasis on Learning Process:

Participants consistently emphasized formative assessment as a process that prioritizes student growth over time rather than final outcomes. It was described as a means of "accompanying the student during learning, not just measuring at the end." Curriculum designers noted the importance of tracking progress and using assessment as a learning tool. One participant stated, "We assess not to label, but to improve. Formative assessment is like a roadmap for learners to see where they are and where they can go."

Constructivist Orientation:

The foundational belief among curriculum designers was that formative assessment must align with constructivist principles. Learning was perceived as an active process where students construct understanding through experience and reflection. As one participant explained, "Students don't just receive knowledge; they build it. Assessment should support that construction." The emphasis was on integrating prior knowledge, promoting engagement, and enabling students to discover meaning in their tasks.

Diagnostic Function:

Formative assessment was regarded as a diagnostic tool to identify student needs and tailor instruction accordingly. Participants mentioned its role in uncovering misconceptions and learning barriers early in the process. A designer shared, "It helps us spot the exact point where the student gets lost—it's like turning the lights on in a dark room." This perspective reinforced the need for assessments that reveal learning gaps rather than merely quantifying performance.

Alignment with Learning Objectives:

Several participants stressed the necessity of aligning formative assessments with clearly defined learning outcomes. They emphasized that assessment criteria should stem from instructional goals and curriculum expectations. One interviewee remarked, "Without alignment, assessment becomes directionless. We must design with the end in mind but teach with flexibility." This reflects a shared belief in backward design principles among curriculum developers.

Learner Autonomy:

Formative assessment was also seen as a tool to foster learner autonomy. Participants highlighted practices such as self-assessment and student-led goal setting. They believed that these practices encourage responsibility and reflection. As one curriculum expert put it, "When students know how to assess themselves, they're no longer passive recipients—they become thinkers and owners of their learning."

Role of Feedback:

Feedback emerged as a core mechanism within formative assessment. Participants underscored that timely, specific, and actionable feedback guides student improvement. According to one participant, "Feedback is the soul of formative assessment. Without it, it's just another test." The designers advocated for integrating feedback cycles that are immediate and constructive, aiming to clarify performance expectations and promote revision.

Category 2: Implementation Challenges and Contextual Barriers

Institutional Constraints:

Curriculum designers pointed to systemic challenges within educational institutions, such as limited time, overloaded curricula, and bureaucratic resistance to innovation. These issues were seen as major obstacles to implementing formative assessment effectively. One participant lamented, "We want to implement it, but the schedule doesn't allow for it—everything is about finishing the textbook."

Teacher Readiness:

Participants expressed concern about the insufficient training of teachers in formative practices. They mentioned that many teachers either lack awareness or hold traditional views that prioritize summative evaluation. As one interviewee noted, "Even if we design formative-based curriculum, if teachers see value only in exams, it won't be used as intended." Professional capacity-building was deemed crucial for reform success.

Policy Misalignment:

Curriculum experts highlighted a disconnect between educational policy and formative assessment goals. National assessments and standardized exams were described as misaligned with formative approaches. One participant commented, "Policy still rewards grades and ranks. Until this changes, formative assessment will stay on the margins."

Cultural Attitudes Toward Assessment:

The prevailing societal preference for high-stakes testing and numerical scores was viewed as a significant cultural barrier. Participants noted that parents and even students often resist assessment approaches that don't yield grades. "Parents want numbers, not narratives," one curriculum developer observed. This mindset discourages innovation in assessment design.

Resource Limitations:

Many participants described resource-related challenges, such as the lack of digital tools, insufficient classroom time, and large student-to-teacher ratios. These constraints make it difficult for teachers to gather and interpret formative data. One expert shared, "Teachers are overwhelmed. They want to give feedback, but they simply don't have the means or time."

Category 3: Strategic Approaches to Effective Practice

Professional Development:

To bridge the gap between policy and practice, participants stressed the need for continuous teacher training. They proposed targeted professional development programs that focus on practical techniques and reflective teaching. One participant stated, "Training needs to move from theory to practice—we must show teachers how to do formative assessment in real classrooms."

Collaborative Curriculum Design:

A collaborative approach to curriculum design was seen as a way to ensure consistency and support among educators. Participants endorsed joint planning, shared assessment rubrics, and inter-teacher feedback as essential components. "When curriculum is built together, implementation becomes stronger," one designer noted.

Use of Technology in Formative Assessment:

Participants discussed how digital tools can facilitate formative practices, especially in providing timely feedback and tracking student progress. They referenced tools such as e-portfolios, mobile apps, and learning analytics dashboards. One curriculum expert remarked, "Technology is not a replacement but a powerful enabler of formative assessment."

Student Involvement Strategies:

Participants strongly advocated for engaging students in the assessment process. Strategies included peer review, self-assessment, and rubric co-construction. One interviewee explained, "When students help create the rubric, they understand it better—and they internalize what quality work looks like."

Continuous Improvement Culture:

A formative assessment system was described not only as a practice but as a culture of continuous improvement. Participants emphasized the need for iterative feedback loops and curricular adjustments based on assessment data. As one participant put it, "We must normalize the idea that curriculum is never final. It evolves with the learner."

Assessment Planning and Integration:

Participants proposed embedding formative assessment directly into lesson plans and learning activities rather than treating it as a separate element. This integration was seen as crucial for sustainability. "Formative assessment should be baked into the learning—not sprinkled on top," one designer commented.

Evidence-based Practice:

Finally, curriculum designers promoted the use of empirical data to guide both instruction and curriculum revisions. They emphasized the role of formative data in tracking outcomes and making strategic decisions. "Assessment without follow-up data is like a diagnosis without treatment," one participant noted.

Discussion and Conclusion

The findings of this study highlight the multifaceted conceptualizations of formative assessment as perceived by curriculum designers, offering insight into how assessment is theorized and operationalized at the curriculum design level. Three primary thematic categories emerged: (1) pedagogical foundations of formative assessment, (2) implementation challenges and contextual barriers, and (3) strategic approaches to effective practice. Each category encompasses several subthemes that illustrate both theoretical understandings and practical concerns. These insights not only extend the existing literature on formative assessment but also provide a focused lens into the curriculum designer's role in fostering or hindering assessment innovation.

A central finding was the strong emphasis on the learning process as the heart of formative assessment. Participants articulated that assessment should serve as a continuous support system embedded in instruction rather than a terminal judgment. This aligns closely with Sadler's (1989) conceptualization of formative assessment as feedback-driven scaffolding intended to close the gap between current and desired performance. Similarly, Black and Wiliam (1998) assert that the purpose of formative assessment is to advance student learning through instructional adjustment. The curriculum designers in this study viewed formative assessment as inherently developmental, underscoring the need for iterative feedback loops and active student engagement.

Equally prominent was the constructivist orientation that underpins participants' views. Curriculum designers framed formative assessment as a tool to facilitate meaning-making and to activate prior knowledge in line with Vygotsky's (1978) sociocultural theory and the zone of proximal development. This conceptual stance is also echoed in Nicol and Macfarlane-Dick's (2006) work, which emphasizes formative assessment as a dialogic process enabling learners to co-construct understanding. By highlighting the interplay between feedback, reflection, and instructional context, participants showed strong alignment with theories that view learning as a socially mediated, dynamic process.

The diagnostic function of formative assessment was frequently discussed, particularly in terms of its ability to surface misconceptions and inform instructional differentiation. Participants emphasized that well-designed formative assessment allows educators to identify and respond to learners' unique needs before they escalate into enduring gaps. This supports the view of Harlen and James (1997), who argue that formative assessment provides timely insights into learner progress and fosters teacher responsiveness. Furthermore, curriculum designers stressed the importance of aligning assessment tasks with specific learning objectives, a principle that is consistent with the concept of constructive alignment as proposed by Biggs and Tang (2007), where learning outcomes, teaching strategies, and assessments are cohesively linked.

Another recurring theme was the promotion of learner autonomy through formative assessment practices such as self-assessment and student goal-setting. Participants noted that involving students in these processes fosters metacognition and responsibility for learning. This perspective is widely supported by the literature, including the work of Andrade and Du (2007), who found that self-assessment enhances student motivation and reflective skills. The curriculum designers' emphasis on autonomy also reinforces Wiliam's (2011) principle of activating learners as owners of their own learning.

Despite their strong pedagogical convictions, participants also outlined significant contextual and systemic barriers that constrain the effective implementation of formative assessment. Among these were institutional constraints, such as rigid time structures and overcrowded curricula, which leave little room for formative practices. These findings mirror those of Looney (2005), who reported similar barriers in international contexts. Additionally, concerns about teacher readiness were prominent, with participants noting a lack of adequate training and support for formative assessment among educators. This is consistent with studies by Heritage (2010) and Bennett (2011), which stress the importance of building teacher assessment literacy through sustained professional development.

Curriculum designers also described the misalignment between assessment policy and formative intentions, especially in systems dominated by high-stakes standardized testing. Participants explained that although formative assessment is theoretically encouraged in policy discourse, summative measures often carry more weight in practice, a tension also noted by Rea-Dickins (2007) and Harris and Brown (2013). Furthermore, cultural preferences for numerical grading and rank-based comparisons were seen as formidable obstacles to the adoption of narrative or process-based assessment strategies. As Clarke (2014) explains, cultural norms regarding assessment significantly shape both perception and implementation.

In response to these barriers, participants proposed strategic approaches to embed formative assessment more effectively into practice. These included enhanced professional development for teachers focused on formative strategies, collaborative curriculum design involving shared assessment planning, and technological tools to support real-time feedback and data analysis. The emphasis on collaboration reflects the growing recognition of professional learning communities (PLCs) as a vehicle for instructional improvement (Stiggins & DuFour, 2009). Technology use, as described by participants, aligns with recent advances in digital assessment tools that support adaptive feedback and learner analytics (Shute, 2008).

Curriculum designers also advocated for increasing student involvement in assessment processes, such as through co-constructing rubrics and conducting peer assessments. This strategy supports Carless's (2007) model of learning-oriented assessment, which promotes active learner engagement in evaluating their own and others' work. The goal, as described by

participants, was to create a culture of continuous improvement, where assessment is embedded into instructional design as a tool for iterative refinement. This aligns with Clarke's (2014) argument that sustainable formative assessment requires a shift in institutional culture, not just instructional practices.

Finally, participants promoted evidence-based decision-making, highlighting the need to collect and analyze formative data to inform curriculum adjustments and instructional strategies. This mirrors the emphasis on data-informed practice in contemporary assessment discourse (Black & Wiliam, 2009). Participants emphasized that formative assessment should not be an add-on but rather an integrated component of instructional planning, a view reinforced by Brookhart (2007) and Popham (2008), who both argue that formative assessment must be seamlessly embedded into the daily teaching and learning process.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

All ethical principles were adhered in conducting and writing this article.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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