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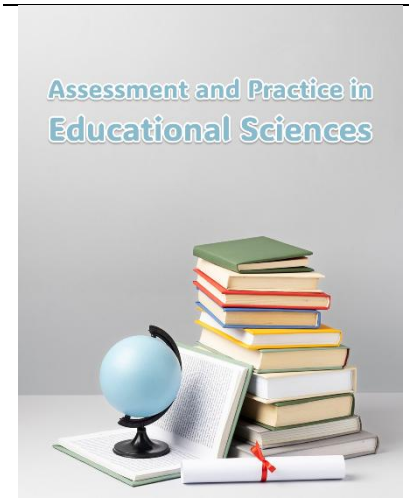

Identifying Pedagogical Factors Influencing the Use of Diagnostic Assessment in Secondary Classrooms

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ABSTRACT

This study aimed to identify and explore the pedagogical factors influencing the implementation of diagnostic assessment in secondary classrooms. This research employed a qualitative design grounded in the interpretivist paradigm to gain a contextual understanding of teacher perceptions and practices related to diagnostic assessment. Data were collected through semi-structured interviews with 20 secondary school teachers in Tehran, selected via purposive sampling to ensure relevant experience and diversity across disciplines. The interviews were transcribed verbatim and analyzed thematically using NVivo software. Thematic saturation was reached through iterative coding and constant comparison. The analysis involved open, axial, and selective coding to identify core themes and underlying patterns across the dataset. The thematic analysis revealed four main categories shaping teachers' use of diagnostic assessment: (1) teacher knowledge and beliefs, (2) institutional support and constraints, (3) student-related factors, and (4) pedagogical practices and classroom dynamics. Key barriers included conceptual misunderstandings about diagnostic assessment, lack of targeted professional development, time constraints, and misalignment between assessment goals and administrative priorities. Facilitators included reflective teaching habits, collaborative school culture, and instructional flexibility. Teachers emphasized the importance of student feedback literacy and the need for emotionally supportive environments for diagnostic strategies to be effective. The integration of diagnostic data into instructional planning was observed only when teachers demonstrated strong assessment literacy and institutional autonomy. Diagnostic assessment in secondary classrooms remains underutilized due to a combination of cognitive, institutional, and contextual barriers. Enhancing its application requires systemic alignment, improved teacher training, and supportive pedagogical cultures that value assessment as a formative and adaptive process.

Keywords: Diagnostic assessment, secondary education, qualitative research, teacher beliefs, assessment literacy, classroom practice, instructional responsiveness.

Introduction

Assessment in education serves not only as a tool for evaluating learning outcomes but also as a central mechanism for informing instruction. While traditional summative assessments aim to quantify student achievement at the end of an instructional cycle, diagnostic assessments play a fundamentally different role by identifying students' prior knowledge, learning needs, and misconceptions before or during instruction. Diagnostic assessment is particularly valuable in promoting differentiated instruction and guiding pedagogical decisions to enhance student learning outcomes (Black & Wiliam, 2009). Despite its recognized potential, the implementation of diagnostic assessment in secondary classrooms remains inconsistent

and frequently underutilized. Understanding the pedagogical factors that influence teachers' engagement with diagnostic assessment is thus critical for developing effective, responsive teaching practices in contemporary classrooms.

Diagnostic assessment, often considered a subset of formative assessment, is defined as a pre-instructional tool that enables teachers to identify specific student strengths and gaps to tailor instruction accordingly (Popham, 2008). Unlike summative assessments that provide evaluative judgments, diagnostic assessments focus on uncovering the causes behind student errors or misconceptions and are intended to inform the next steps in the instructional process (Heritage, 2010). Research has emphasized that diagnostic assessments can significantly improve instructional precision by helping teachers make informed decisions about content emphasis, pacing, and scaffolding (Brookhart, 2011). Moreover, diagnostic assessment can support equitable teaching by making learning difficulties visible and actionable, particularly for students with diverse linguistic, cognitive, or cultural backgrounds (Looney, 2005).

Nevertheless, empirical studies indicate that the use of diagnostic assessment in classrooms is far from optimal. Several scholars have documented that many teachers lack sufficient knowledge, confidence, or institutional support to implement diagnostic strategies effectively (DeLuca, LaPointe-McEwan, & Luhanga, 2016; Xu & Brown, 2017). In many educational contexts, especially in systems with high-stakes testing cultures, assessment practices tend to be driven by accountability measures rather than formative or diagnostic goals (Klenowski, 2009). This results in a reliance on summative tests and standardized formats, with limited attention to tools that diagnose and respond to student learning needs dynamically.

Teachers' beliefs and knowledge play a pivotal role in shaping their assessment practices. According to assessment literacy frameworks, teachers must possess not only technical knowledge of assessment tools but also the interpretive skills to make sense of assessment data and integrate it into instruction (Stiggins, 2002). However, studies show that even experienced teachers often struggle with understanding the conceptual distinctions between diagnostic, formative, and summative assessments (Fulmer, Lee, & Tan, 2015). Misunderstandings regarding the timing, purpose, and design of diagnostic assessment can lead to inappropriate applications or underuse. For example, teachers may mistakenly treat a diagnostic task as a grading opportunity or fail to use the results to modify instruction, thereby nullifying its intended formative impact.

Beyond individual knowledge and beliefs, institutional and contextual factors also shape how diagnostic assessments are practiced. School culture, time constraints, administrative expectations, and curriculum rigidity often limit teachers' flexibility to engage in responsive assessment (Remesal, 2011). In many cases, schools prioritize coverage of curriculum content over instructional adaptability, discouraging the iterative feedback cycles necessary for diagnostic assessment to function effectively (Bennett, 2011). Additionally, limited access to resources, such as validated diagnostic instruments or digital platforms, poses logistical challenges, particularly in under-resourced schools (Volante & Fazio, 2007).

Professional development (PD) is commonly cited as a means of enhancing teachers' assessment literacy and diagnostic competencies. However, existing PD programs frequently focus on summative assessment or grading systems, with insufficient emphasis on diagnostic design and interpretation (Gulikers, Bastiaens, & Kirschner, 2004). Sustainable professional learning requires ongoing support, opportunities for collaboration, and practical applications embedded in teachers' daily instructional routines (Darling-Hammond et al., 2017). Without such conditions, teachers may find diagnostic assessment difficult to operationalize, even when they understand its theoretical value.

Another key dimension involves student-related factors, such as learners' feedback literacy and their emotional responses to assessment. Research indicates that students vary widely in their ability to interpret and act on feedback, particularly in diagnostic contexts where feedback is non-normative and developmental (Carless & Boud, 2018). Diagnostic tasks may also provoke anxiety or resistance if students perceive them as tests rather than learning tools. Therefore, creating a classroom culture that normalizes diagnostic assessment as a routine part of learning—not as a judgment—is crucial to its success (Wiliam,

2011). Teachers must be skilled not only in administering diagnostic tools but also in framing them appropriately to students and using the results to foster meaningful dialogue and reflection.

In addition, the integration of technology into diagnostic assessment has opened new possibilities for data collection and feedback. Digital platforms can offer real-time analytics, personalized feedback, and adaptive questioning, making diagnostic insights more accessible and scalable (Shute & Rahimi, 2021). However, these technologies require appropriate digital literacy and training among teachers, as well as infrastructural support from schools. In contexts where such conditions are lacking, the potential of digital diagnostic assessment remains underutilized.

The literature also highlights that pedagogical responsiveness—the ability to adapt instruction based on diagnostic insights—is a key marker of effective teaching. Diagnostic assessment alone does not improve learning; rather, its effectiveness depends on how teachers use the data to adjust instructional practices (Heritage, 2007). This responsiveness involves changes in grouping strategies, pacing, curriculum modification, and feedback personalization, all of which require a high degree of instructional agility. Teachers who can make real-time instructional decisions based on diagnostic data are more likely to meet diverse learner needs and close achievement gaps.

Despite the growing theoretical and policy emphasis on diagnostic assessment, there remains a need for more contextualized, qualitative studies that explore how secondary school teachers understand and implement diagnostic practices in their everyday classrooms. Much of the existing research has focused on primary education, standardized contexts, or policy-driven reforms, leaving a gap in understanding the actual pedagogical experiences of teachers at the secondary level, particularly in non-Western urban contexts such as Tehran. Given the layered challenges of curriculum pressure, exam orientation, and limited PD infrastructure, it is crucial to identify the pedagogical, institutional, and cultural factors that shape diagnostic assessment in these settings.

This study aims to address that gap by exploring the pedagogical factors influencing the use of diagnostic assessment in secondary classrooms in Tehran. Using a qualitative approach grounded in semi-structured interviews with experienced teachers, the study investigates how teachers conceptualize diagnostic assessment, what barriers and facilitators they encounter in its implementation, and how institutional and classroom dynamics affect their ability to act on diagnostic information. By illuminating these contextualized experiences, the research contributes to a deeper understanding of the conditions necessary to support meaningful diagnostic practice in secondary education.

Methods and Materials

Study Design and Participants

This study adopted a qualitative research design grounded in an interpretivist paradigm, aiming to explore the pedagogical factors that influence the implementation of diagnostic assessment practices in secondary classrooms. Given the exploratory nature of the research question, a qualitative approach was deemed most appropriate to capture the nuanced experiences and perspectives of teachers regarding their instructional decisions. The study employed semi-structured interviews to elicit in-depth narratives from participants, allowing for flexibility in probing individual beliefs, practices, and contextual constraints.

Participants were selected through purposive sampling to ensure the inclusion of individuals with direct experience in diagnostic assessment practices. The final sample consisted of 20 secondary school teachers from various public and private institutions across Tehran. Inclusion criteria required participants to have at least three years of teaching experience at the secondary level and a demonstrable familiarity with formative and diagnostic assessment strategies. Efforts were made to

achieve variation in subject area, years of experience, and school type to enrich the diversity of perspectives. Interviews continued until theoretical saturation was reached, whereby no new conceptual insights emerged from subsequent interviews.

Data Collection

Data were collected through semi-structured interviews conducted in-person or via secure online platforms, depending on participant preference and accessibility. An interview guide was developed based on a review of the existing literature and expert consultation, covering topics such as conceptions of diagnostic assessment, factors influencing its application, institutional support, and perceived challenges. Each interview lasted approximately 45 to 60 minutes and was audio-recorded with informed consent. Field notes were also taken to document contextual observations and non-verbal cues. All interviews were transcribed verbatim to ensure data accuracy and facilitate in-depth analysis.

Data analysis

The transcribed interviews were analyzed using thematic analysis, guided by the principles of Braun and Clarke. NVivo qualitative data analysis software was employed to organize, code, and manage the data systematically. The analytical process involved multiple stages: initial coding of open concepts, categorization of codes into axial themes, and the development of higher-order themes that reflected selective coding. The coding scheme was refined iteratively as new data were incorporated, and emergent patterns were constantly compared and contrasted to ensure internal coherence and analytical rigor. Credibility was enhanced through member checking with selected participants and peer debriefing sessions with qualitative research experts.

Findings and Results

The first theme, *Teacher Knowledge and Beliefs*, revealed that a foundational understanding of diagnostic assessment was inconsistent among participants. Many teachers conflated diagnostic assessment with general formative practices or assumed it merely involved identifying student mistakes. As one teacher noted, *"I think diagnostic tests are just pre-tests we give to see how much they remember from last year"* (P7). Such misunderstandings indicated a conceptual gap regarding the goal of identifying learning needs for instructional adjustment.

Assessment literacy also emerged as a critical subtheme. While some teachers were able to design basic assessments, few demonstrated the ability to interpret diagnostic data systematically. One participant explained, *"Even when I collect information about my students' weaknesses, I don't really know what to do with it afterward"* (P12). The data revealed that limited training on diagnostic tools and data interpretation constrained teachers' ability to utilize assessment results effectively.

Beliefs about student learning strongly influenced the extent to which diagnostic assessment was used. Teachers with a growth mindset were more likely to implement diagnostic strategies, seeing them as tools for promoting learning progression. One respondent expressed this clearly: *"If I don't know where my students are struggling, I can't help them grow"* (P5). Others, however, viewed such assessment as unnecessary, assuming learning differences would resolve through repetition or standard teaching methods.

The role of professional development was frequently raised, with many teachers stating they had not received specific training on diagnostic assessment. Some relied on informal discussions with colleagues or personal experimentation. *"Everything I've learned about assessment has been from trial and error, not from any official training"* (P2). The lack of structured PD opportunities created a significant barrier to consistent implementation.

Reflection and metacognition played a mediating role in teachers' willingness to engage with diagnostic strategies. Those who regularly reflected on their teaching practices were more likely to value assessment as a feedback mechanism. *"After each class, I think about what worked and what didn't—and that's where assessment fits in for me"* (P19). This self-awareness promoted more intentional diagnostic usage.

Curricular alignment emerged as another influential factor. Teachers reported that rigid curricula and heavy syllabi left little room for diagnostic flexibility. As one participant stated, *"There's no time to stop and assess if we're behind on the textbook"* (P14). This disconnect limited teachers' autonomy to tailor instruction based on assessment data.

Finally, teacher confidence and self-efficacy significantly affected the use of diagnostic tools. Teachers who lacked confidence in interpreting assessment data or feared labeling students unfairly were hesitant to use diagnostic practices. *"What if I misjudge a student and make things worse?"* questioned one participant (P11). This uncertainty often resulted in avoiding diagnostic approaches altogether.

The second theme, *Institutional Support and Constraints*, showed that administrative expectations were often misaligned with diagnostic assessment goals. Several teachers reported pressure to focus on exam results rather than identifying individual learning needs. One teacher noted, *"We're judged based on students' grades, not how we help them learn"* (P16), reflecting a widespread focus on summative performance.

Assessment infrastructure was another prominent concern. Participants described a lack of templates, tools, or access to digital platforms to conduct or analyze diagnostic assessments. *"We don't have any real system for collecting or using diagnostic data—it's all on paper and very basic"* (P3). The absence of institutional resources inhibited innovation.

Time and workload management were persistent barriers. Teachers described overloaded schedules and limited planning time, which undermined their capacity to design or respond to diagnostic assessments. One participant explained, *"I barely have time to mark homework, let alone create special diagnostic tools"* (P6). This time constraint discouraged reflective, data-informed instruction.

Peer collaboration and culture also shaped diagnostic practices. Teachers in collegial environments were more likely to discuss assessment strategies and co-develop tools. In contrast, isolated teachers struggled to share or test diagnostic approaches. *"We don't really have a space to talk about assessment unless someone's in trouble"* (P17). This cultural element either enabled or restricted professional learning.

Policy communication added another layer of complexity. Participants expressed confusion about national or institutional expectations regarding assessment. As one teacher shared, *"The guidelines are vague—we hear about assessment reforms, but no one tells us what that means in practice"* (P10). This ambiguity led to inconsistent application and resistance.

The third theme, *Student-Related Factors*, began with student engagement. Teachers observed that some students responded passively or anxiously to diagnostic assessments, particularly when they feared being labeled as weak. One teacher explained, *"Some students just shut down if they think they're being tested for failure"* (P13). This emotional resistance reduced the effectiveness of the practice.

Learner diversity and needs emerged as a significant subtheme. Participants highlighted the difficulty of designing assessments for classrooms with wide-ranging abilities. *"In one class, I have students who need basic support and others who want advanced problems. It's hard to create one diagnostic tool for all"* (P18). Teachers often lacked training in differentiated assessment design.

Parent expectations and pressure also played a role. Several teachers noted that parents often equated assessments with grades, undermining the formative intent of diagnostic assessment. *"Parents don't understand when I say a test isn't for*

marks—they demand scores and comparisons" (P1). This misunderstanding created external pressure to avoid diagnostic approaches that lacked numeric outcomes.

Peer influence in classrooms was another relevant subtheme. Students reportedly compared results or teased peers after low performance, which discouraged honest participation in diagnostic activities. *"When students know they'll be laughed at for low scores, they don't try"* (P8). This social dynamic reduced the reliability of diagnostic outcomes.

Student feedback literacy, or the ability to understand and act on feedback, was notably limited. Teachers observed that students often ignored or misinterpreted feedback provided through diagnostic assessments. *"They look at the comments and say 'ok,' but don't really change anything in the next task"* (P20). Without explicit instruction on how to use feedback, diagnostic efforts often failed to produce growth.

The fourth theme, *Pedagogical Practice and Classroom Dynamics*, highlighted instructional planning as a key site of diagnostic application. Teachers who used diagnostic data during lesson preparation were more likely to adjust pacing, groupings, or content difficulty. *"When I find out what they don't understand, I change how I teach the next day"* (P4). This linkage enhanced instructional responsiveness.

Feedback delivery strategies varied, but teachers emphasized the importance of timeliness and tone. *"If I give feedback a week later, it's too late. It has to be quick and kind"* (P9). Personalized feedback that addressed individual misconceptions was more impactful than generic comments.

Use of assessment data extended beyond feedback. Participants discussed how they used data to shape instructional decisions, track student growth, and develop individualized support. *"Sometimes I see the same mistake over and over—that tells me it's not the student's fault; it's how I taught it"* (P15). Diagnostic data were thus used to evaluate both student and teacher performance.

Teacher–student communication was another relevant aspect. Teachers who engaged in open dialogue about assessments fostered a culture of trust and reflection. One teacher explained, *"I ask them how they think they did before I even give my feedback—it helps them become more aware"* (P6). This dialogic process enhanced diagnostic impact.

Technology integration offered both promise and limitations. While some teachers used online platforms to generate quick feedback, others cited access issues or lack of training. *"I use Google Forms sometimes, but I don't know how to analyze the results properly"* (P2). Technology was helpful only when accompanied by digital literacy.

Lastly, flexibility and responsiveness were identified as crucial traits in successful diagnostic implementation. Teachers who adjusted their plans based on real-time student performance were more likely to close learning gaps. *"If something's not working, I stop and change it. That's what assessment is for"* (P5). This agility made diagnostic assessment an ongoing part of teaching rather than a discrete event.

Discussion and Conclusion

The purpose of this qualitative study was to explore the pedagogical factors influencing the implementation of diagnostic assessment in secondary classrooms, drawing on the perspectives of 20 teachers from Tehran. The findings revealed four core thematic categories: teacher knowledge and beliefs, institutional support and constraints, student-related factors, and pedagogical practices and classroom dynamics. Collectively, these themes highlight that diagnostic assessment, while theoretically valuable, remains underused in practice due to a complex interplay of cognitive, institutional, and contextual barriers.

One of the most salient findings was the fragmented understanding of diagnostic assessment among teachers. Many participants confused diagnostic tools with summative or formative assessments, suggesting a lack of clarity in defining its

specific purpose and application. This is consistent with the work of Fulmer, Lee, and Tan (2015), who found that assessment literacy among teachers is often limited, especially when it comes to differentiating between various types of assessment. Without a robust conceptual framework, teachers struggle to design or implement diagnostic strategies effectively, leading to either superficial application or complete avoidance. Stiggins (2002) similarly argues that the absence of clear conceptual knowledge about assessment hinders the development of practices aimed at informing instruction rather than judging performance.

The role of teacher beliefs was also central. Teachers who held constructivist views of learning and believed in the importance of addressing individual student needs were more likely to engage with diagnostic assessment, aligning with the findings of Black and Wiliam (2009), who assert that teacher mindset is a key determinant in the adoption of formative practices. Conversely, participants who emphasized content coverage and viewed learning difficulties as static were less inclined to invest time in diagnostic efforts. This dichotomy reflects the broader tension between traditional transmissive models of teaching and contemporary learner-centered paradigms. According to Heritage (2010), diagnostic assessment thrives in pedagogical environments where teachers believe in adapting instruction to meet evolving learner profiles.

Professional development, or the lack thereof, emerged as a major influence on practice. While most participants acknowledged the theoretical value of diagnostic assessment, they also admitted having received little to no formal training in how to design, implement, or respond to diagnostic tools. This echoes the findings of DeLuca, LaPointe-McEwan, and Luhanga (2016), who highlighted the absence of diagnostic assessment training in teacher education programs worldwide. The mismatch between policy-level advocacy for formative and diagnostic practices and the actual training provided to teachers remains a persistent challenge. Darling-Hammond et al. (2017) contend that sustainable improvement in assessment practices requires ongoing, embedded professional learning that is aligned with teachers' daily realities.

Institutional and systemic constraints further shaped how diagnostic assessment was used—or not used—in classrooms. Participants noted that administrative priorities, especially those emphasizing high-stakes summative testing and curriculum completion, often discouraged the use of diagnostic practices. This mirrors findings by Klenowski (2009), who emphasized that accountability pressures in many education systems lead schools to focus on measurable outcomes rather than diagnostic insight. The lack of infrastructure, including diagnostic tools, platforms, or time within the school schedule, was also frequently cited as a barrier. According to Volante and Fazio (2007), even motivated and informed teachers cannot implement diagnostic strategies without institutional support, reinforcing the need for systemic alignment.

Student-related factors, particularly feedback literacy and emotional responses to assessment, also influenced the effectiveness of diagnostic approaches. Teachers expressed frustration that students either ignored diagnostic feedback or misunderstood its intent, reflecting concerns raised by Carless and Boud (2018), who argue that student feedback literacy is critical for maximizing the utility of assessment. Furthermore, the fear of stigma or peer judgment often reduced student engagement in diagnostic tasks, especially in classrooms where results were interpreted publicly or informally shared. As Wiliam (2011) notes, diagnostic assessment must be embedded within a culture of trust and learning, not performance comparison, if it is to produce meaningful insights.

Another noteworthy theme was the role of teacher–student communication in mediating the impact of diagnostic data. Teachers who engaged in reflective dialogue with students, encouraging them to self-assess or discuss their difficulties, reported more successful diagnostic practices. This supports the view of Brookhart (2011), who asserts that assessment is most powerful when it is dialogic and collaborative rather than unidirectional. The use of diagnostic insights was most effective when combined with personalized feedback, ongoing conversation, and instructional responsiveness.

Technology was identified as both an enabler and a constraint. While some participants used digital tools like Google Forms to streamline diagnostic questioning, they often lacked the analytical skills or institutional support to interpret the data meaningfully. This finding is aligned with Shute and Rahimi (2021), who underscore the need for digital literacy and infrastructure when integrating technology into assessment. In low-resource environments, the digital potential of diagnostic assessment remains largely untapped unless accompanied by technical training and infrastructural investment.

Perhaps the most compelling finding was the link between diagnostic assessment and pedagogical flexibility. Teachers who viewed instructional planning as a dynamic process, rather than a fixed script, were more likely to adapt their teaching based on diagnostic insights. This capacity to be responsive—to slow down, revisit prior content, or adjust groupings based on diagnostic data—was a hallmark of effective practice, echoing the findings of Heritage (2007), who described instructional agility as a key component of formative assessment systems.

These findings collectively indicate that improving the use of diagnostic assessment in secondary classrooms requires more than technical fixes or one-off training. It demands a cultural and systemic shift that aligns teacher beliefs, institutional expectations, student engagement, and pedagogical habits toward a model of responsive, data-informed instruction. Diagnostic assessment cannot thrive in isolation; it requires supportive ecosystems where teachers are empowered, students are engaged, and assessment is understood as integral to learning rather than peripheral.

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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 adheried 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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