Foreign Language Teaching and Translation Studies

Sheikhbahaee University

The Role of Pre-Service Teachers in Noticing Student Thinking: A Study in Iranian High Schools

Nadia Gharani *iD

Department of English Language Teaching, Faculty of Humanities, Islamic Azad University, Gonbad-e-Kavous, Iran
*Corresponding author: *nadia.gh1998@gmail.com*

ARTICLE INFO

ABSTRACT

This study aimed to explore the challenges faced by pre-service teachers in Iran in noticing and responding to student thought processes during English language instruction, as well as the strategies they employed to engage with student thinking. Utilizing grounded theory and qualitative analysis, the research sought to provide a deeper understanding of these challenges and strategies to inform teacher education practices. The findings revealed significant difficulties in recognizing diverse student thinking and managing classroom dynamics. To address these challenges, pre-service teachers adopted strategies such as open-ended questions and group discussions, which fostered deeper understanding, clarified students' ideas, and promoted a more interactive learning environment. The results highlighted the urgent need for teacher education programs in Iran to develop skills that enhance the ability to respond to students' thinking. Specifically, programs should focus on competencies such as pedagogical competence, cognitive skills, interpersonal communication, reflective practice, technological proficiency, and entrepreneurial competencies. By strengthening these competencies, pre-service teachers can improve their English instruction and effectiveness. Educational programs could benefit from integrating practical experiences like micro-teaching sessions and workshops on effective questioning techniques. This approach will better prepare future educators to navigate student engagement, leading to more effective teaching practices in Iran's educational landscape.

1. Introduction

In 2014, reflecting the expanding global integration of higher education and the growing prevalence of English as the language of instruction, several researchers examined this phenomenon (Smit & Dafouz, 2012; Doiz et al., 2013; Wächter & Maiworm, 2014; Dimova et al., 2015). By analyzing instructional video clips of classroom interactions, pre-service teachers (PSTs) can learn to notice students' thinking in sophisticated ways, thereby enhancing their understanding of teaching practices (Grossman et al., 2009).The process of noticing entails focusing on and analyzing the essence of students' thoughts and contributions (van Es & Sherin, 2021).

Previous studies have indicated that teacher preparation programs have the potential to assist pre-service teachers (PSTs) in enhancing their ability to focus on the various elements that impact a particular teaching situation. These programs also help them to analyze and make sense of their perceptions regarding the dynamics occurring during those moments (Barnhart & van Es, 2015; Johnson & Cotterman, 2015; Levin & Richards, 2011; Wiens et al., 2021). Nonetheless, the ways in which teachers react to their observations of student thinking have remained a relatively neglected area of research in the field of education (Luna, 2018; Schwarz et al., 2020).

Addressing student thinking presents a unique and demanding skill that differs from merely observing it (Harris et al., 2012; Luna & Selmer, 2021). Moreover, this skill is arguably the most vital component of effective teaching, as actively engaging with and developing students' ideas is what ultimately makes instruction adaptable and responsive (Robertston et al., 2016).

Effective learning sequences cannot thrive without responsive teaching (Thompson et al., 2016). Yet being responsive involves more than just recognizing student thinking or having a repertoire of teaching strategies. The goals set for instruction play a crucial role in determining how teachers engage with students' ideas. Consequently, when a teacher identifies a specific instance of student thinking, their understanding of that moment and how it connects to their instructional objectives can significantly influence their subsequent response.

2. Literature Review

2.1. Recognizing and Reacting: Two Connected Dimensions of Teaching

Recognizing and reacting are two interconnected dimensions of teaching that are essential for effective classroom instruction. Recognizing involves the teacher's ability to notice and interpret students' thoughts, feelings, and learning processes. This dimension emphasizes the importance of awareness in teaching, allowing educators to identify when students are struggling, engaged, or confused (Hattie & Timperley, 2007). Effective recognition requires teachers to be observant and attuned to classroom dynamics, including both verbal and non-verbal cues from students. By developing this skill, teachers can create a more responsive learning environment that meets the diverse needs of their students.

Reacting, on the other hand, refers to how teachers respond to the recognized needs of their students. This dimension involves adapting instructional strategies based on insights gained from observation (Hattie, 2009). For instance, if a teacher notices that many students are struggling with a particular concept, they might choose to modify their teaching approach, provide additional resources, or facilitate group discussions to enhance understanding. This responsive behavior is critical for fostering an inclusive classroom where all students feel supported and valued.

The implications of these dimensions highlight the need for teacher education programs to emphasize the development of skills related to both recognizing and reacting. By training pre-service teachers in these areas, educational institutions can better prepare future teachers to address the complexities of student engagement (Marzano et al., 2003). Programs could incorporate practical experiences such as micro-teaching sessions, peer observations, and workshops focused on effective questioning techniques and feedback strategies.

Addressing student thinking is essential for fostering ambitious teaching and learning (Singer-Gabella et al., 2016). We differentiate between merely reacting to students' ideas and thoughtfully responding in ways that consider the disciplinary content of their thoughts, the implications for their developing understanding, and how instruction focused on those concepts can effectively enhance their learning (Barnhart, 2022).

To effectively engage with students, teachers need to first focus on and comprehend the ideas that students convey through their discussions and assignments (Ruiz-Primo & Furtak, 2007). Although educators may observe different types of student thinking during lessons, many find it difficult to interact with these ideas in ways that foster students' development in understanding (Larkin, 2012; Stein et al., 2008).

In conclusion, teachers who excel in recognizing and reacting are better equipped to support their students' learning journeys. This dual focus not only enhances student engagement but also leads to improved educational outcomes (Hattie & Clarke, 2019). As educational research continues to evolve, it is crucial for teacher preparation programs to integrate these dimensions into their curricula, ultimately fostering more effective teaching practices in diverse classroom settings.

2.2. Teacher Awareness of Student Thought Processes

Instruction encompasses the orchestration of "interactions between educators and learners focused on content within specific environments" (Cohen et al., 2003, p. 122). Over the past two decades, the significance of each of these elements has evolved. Teaching transcends simply implementing a set of strategies or utilizing a sequence of techniques. It is not solely about imparting a collection of information for students to memorize. Instead, the aim of teaching is to cultivate students' reasoning and skills in knowledge application, including problem-solving and constructing explanations (Bransford et al., 2004; Windschitl et al., 2018).

To engage in this intricate issue, an educator must focus on students and their thought processes. One area of research aimed at enhancing this facet of teaching is teacher noticing. Mason's (2002) initial definition of noticing describes it as "a set of practices for both experiencing and learning from situations, as well as for guiding future actions" (p. 29). He explains that disciplined noticing necessitates the effort to highlight certain aspects of one's surroundings while downplaying others.

Additional researchers have identified elements of teacher noticing that can be cultivated through structured practice. van Es and Sherin (2021) suggested that teacher noticing consists of attending (recognizing significant features of classroom interactions) and interpreting (analyzing what was observed to establish connections to broader educational principles).

2.3. The Process of Engaging with Student Thought

What a teacher perceives in the classroom, whether consciously or unconsciously, significantly impacts his subsequent actions (Erickson, 2011). For instance, "Jacobs and her team (2011) emphasized that teachers' choices regarding how to address students' levels of understanding are vital to the concept of professional noticing. They suggested that the acts of observing and interpreting should not be viewed as ultimate objectives; rather, they serve as foundational steps for developing effective instructional strategies (p. 100)."

While the act of noticing itself does not encompass responding, a teacher's responses are significantly influenced by their observations and interpretations of those observations (Richards et al., 2020). In their study on the abilities of preservice teachers (PSTs) to focus on, analyze, and react to student thought processes, Barnhart and van Es (2015) identified the decision-making process regarding responses as a key factor in assessing the level of sophistication in noticing. Their research highlights the relationship between noticing and responding, revealing that effective and nuanced responses to student contributions necessitate a high level of attentiveness to those contributions.

In this research, the researcher defines noticing as comprising both attending to students' thinking and interpreting their ideas and contributions (van Es & Sherin, 2021), while viewing the decision on how to respond as a distinct yet closely related element of teaching. Some researchers argue that recognizing students' thought processes can enhance the responsiveness of teachers' instructional strategies (Jacobs et al., 2011; Levin et al., 2013).

Others suggest that teachers should employ specific strategies to create an environment where students can express their thinking, allowing teachers to develop a deeper understanding of how to notice and engage with those ideas (Haverly et al., 2020). Additionally, some perspectives see the teacher's role as that of a conversation facilitator, who employs discourse techniques to highlight specific ideas, encourage further elaboration, and connect various concepts in ways that foster and sustain student understanding, unlike assessments that merely judge the accuracy of students' thoughts (Cartier et al., 2013; Hagenah et al., 2018; Schwarz et al., 2020).

In this study, we sought to explore the challenges faced by pre-service teachers (PSTs) in Iran regarding their ability to notice student thought processes during English instruction. This investigation aimed to identify the specific obstacles that hinder PSTs' awareness of student thinking, such as difficulties in interpreting student responses, managing diverse classroom dynamics, and addressing varying student needs. Understanding these challenges is crucial, as they directly impact teaching effectiveness and the overall learning environment. The research questions guiding this study were formulated to address these areas of inquiry, focusing on both the challenges and the strategies that pre-service teachers encounter. The research questions and prompts guiding this study were as follows:

1. What challenges do pre-service teachers in Iran face in noticing student thought processes during English instruction?

2. What strategies do pre-service teachers in Iran employ to engage with student thinking in English classes?

3. Method

The research was based on a qualitative study conducted in Iran to explore the challenges faced by pre-service teachers in noticing student thought processes during English instruction, as well as the strategies they employed to engage with student thinking in their classrooms. This study utilized grounded theory as its methodological framework. This exploratory methodology allows researchers to uncover a wide range of perspectives and insights shared by participants, providing a deeper understanding of their experiences. By focusing on the specific challenges and strategies of pre-service teachers, this study aimed to identify common themes that can inform future teacher education practices. As emphasized by Lincoln (2021), qualitative research is particularly effective in revealing the complexities of participants' experiences, making it a valuable approach for this investigation.

3.1. Participants

The participants in this study comprised 30 English pre-service teachers from four high schools located in Gonbad-e-Kavous, Golestan Province, Iran. Among these participants, 26 were female and 4 were male. The participants' ages ranged from 24 to 45 years, showcasing a diverse group in terms of life experience and maturity. All participants were pre-service teachers with no prior teaching experience. Convenience sampling was utilized to select participants, allowing for practical and efficient data collection from a readily available population. This approach enabled the researcher to gather valuable insights from this specific group, facilitating a rich exploration of the challenges and strategies related to self-regulated learning (SRL) in English instruction, as these pre-service teachers contributed their insights (Sedgwick, 2013).

3.2. Instruments

To gather data for the study, the researcher employed semi-structured interviews. The semi-structured interviews were conducted with each pre-service teacher. These interviews allowed for a flexible and in-depth exploration of

the participants' experiences, challenges, and strategies related to noticing and engaging with student thought processes during English instruction. The researcher used open-ended questions to encourage the participants to share their perspectives and insights in detail (Appendix A).

The interview questions were developed by the researcher based on consultations with three educational experts from Islamic Azad University of Gonbad-e-Kavous, Golestan Province, Iran. To ensure the validity of the interview questions, a pilot study was conducted involving two sessions with five pre-service teachers who were not part of the main study sample. These pilot sessions helped refine the wording, clarity, and relevance of the questions. Feedback from these participants was used to revise and improve the interview protocol, ensuring that it effectively captured the complexities of pre-service teachers' experiences in recognizing and responding to student thought processes.

The semi-structured interview format facilitated a deeper understanding of the participants' unique contexts, backgrounds, and perspectives, which are critical for capturing the complexities of their experiences in noticing and engaging with student thinking. The flexibility inherent in this approach enabled the researcher to prompt rich, descriptive responses that revealed the challenges PSTs faced and the strategies they employed in recognizing and responding to student ideas.

Semi-structured interviews, as noted by Dornyei (2014) and Dornyei and Taguchi (2009), are vital for obtaining qualitative data in studies focused on social phenomena. This adaptable method permits researcher to modify the arrangement of questions and interact personally with participants, which encourages a deeper understanding of their experiences and viewpoints. Additionally, the reliability of the interview process was enhanced by maintaining consistency in how questions were posed across all 30 interviews while allowing for flexibility to probe deeper into participant responses when necessary.

3.3. Data Collection

Data collection for this study was conducted solely through semi-structured interviews with English pre-service teachers. The researcher aimed to gather in-depth insights into the challenges these teachers faced in noticing student thought processes and the strategies they employed to engage with student thinking during English instruction. The researcher selected a sample of 30 English pre-service teachers from four high schools in Gonbad-e-Kavous. Each interview lasted approximately 10 to 15 minutes and was designed to elicit detailed responses regarding the participants' experiences in the classroom.

The interview questions focused on two main areas: the challenges encountered in recognizing student thought processes and the strategies used to foster engagement with student thinking. This targeted approach enabled the researcher to delve deeply into the specific difficulties faced by PSTs, such as their struggles to interpret student responses and manage classroom dynamics. Additionally, the questions encouraged participants to discuss the strategies they found effective in engaging students, such as collaborative learning activities and providing constructive feedback.

3.4. Data Analysis

Data analysis for this study utilized thematic analysis to identify and interpret patterns within the qualitative data from the semi-structured interviews. Qualitative data analysis techniques were utilized, incorporating coding and categorization methods (Campbell et al., 2013), to guarantee a detailed and extensive exploration of the participants' viewpoints.

The data analysis was conducted by the researcher, who holds a Master's degree in Teaching English as a Foreign Language (TEFL) from Islamic Azad University of Gonbad-e-Kavous, Golestan Province, Iran. The researcher has prior experience in conducting qualitative studies and analyzing teacher education practices, which contributed to the depth and reliability of the analysis.

The researcher employed traditional tools such as colored pens, paper, and sticky notes to organize the information and identify recurring themes. No electronic software was utilized at any stage of the data analysis process. Initially, the researcher transcribed the audio recordings of the semi-structured interviews verbatim to ensure an accurate representation of participants' responses. This careful transcription allowed for a nuanced understanding of each participant's voice and perspective.

Following this, the researcher engaged in multiple readings of the transcripts to immerse themselves in the data and gain a comprehensive understanding of the content. During this immersion, common patterns and themes frequently mentioned in the participants' responses were identified and categorized. To ensure reliability, the researcher cross-checked themes with an external reviewer an academic colleague with expertise in qualitative research who provided feedback on the coding process and thematic categorization. This thematic analysis facilitated a detailed exploration of the challenges and strategies related to self-regulated learning (SRL) in English instruction. The findings were then examined and discussed qualitatively, providing rich insights into the experiences and perspectives of pre-service teachers (Dörnyei, 2007).

4. Results

This study examined the experiences of 30 English pre-service teachers from four high schools in Gonbad-e-Kavous, revealing their challenges and strategies in engaging with student thinking. Table 1 summarizes the frequency and percentage of comments from the pre-service teachers regarding challenges in noticing student thought processes. The most significant challenge was difficulty in noticing these processes, accounting for (43.3%) of comments, indicating a widespread struggle among teachers. The second most common issue was a lack of training (16.7%), suggesting many feel inadequately prepared to engage effectively. Other challenges included interpreting student responses (13.3%) and managing large class sizes (10.0%). Additionally, "Other Challenges" (10.0%) reflects various factors, such as classroom management and resource limitations, that hinder teachers' focus on student thinking. These findings highlight critical areas where pre-service teachers need support and training to enhance their effectiveness in instruction.

Table 1

Distribution of Teacher Comments by Category

Category	Frequency	Percentage (%)
Challenges in Noticing Student Thought Processes	13	43.3
Lack of Training	5	16.7
Difficulty Interpreting Student Responses	4	13.3
Large Class Sizes	3	10.0
Relationship with Students	2	6.7
Time Constraints	2	6.7
Cultural Differences	1	3.3
Total	30	100%

4.1. Challenges Identified by Pre-Service Teachers in Noticing Student Thought Processes

Table 2 offers a comprehensive overview of the categories of challenges identified by pre-service teachers, accompanied by illustrative statements that provide deeper insights into their experiences. Each statement serves to illuminate the specific difficulties these teachers encounter in their efforts to notice and engage with student thought processes during English instruction. The challenges are categorized to help identify common themes and issues, such as difficulties in recognizing student thinking, interpreting responses, and managing classroom dynamics.

Moreover, the interpretations drawn from the data highlight a pressing need for improved training within teacher education programs. Many pre-service teachers expressed a desire for more practical strategies that would enable them to better notice and respond to student thinking. This indicates that current training may not fully equip them with the necessary tools to navigate the complexities of classroom interactions effectively.

Furthermore, the challenges related to navigating cultural differences and time constraints were also prominent in the teachers' comments. In diverse classrooms, understanding students' cultural backgrounds and perspectives is crucial for effective engagement. Pre-service teachers may feel unprepared to address these differences, which can impact their ability to connect with students. Time constraints, on the other hand, can limit opportunities for meaningful interactions and reflections on student thinking, making it difficult for teachers to implement strategies that foster deeper understanding.

Overall, Table 2 not only categorizes the challenges faced by pre-service teachers but also emphasizes the urgent need for targeted support and training. By addressing these challenges through enhanced training programs, relationship-building techniques, and strategies for managing cultural differences and time constraints, teacher education institutions can better prepare future educators to engage effectively with student thought processes, ultimately improving the quality of instruction and learning outcomes in the classroom.

Table 2

Summary of Categories of Challenges and Examples Teacher Statements

Categories	Illustrative Teacher Statements	Interpretation
Challenges in Noticing Student Thought Processes	"I often struggle to understand what my students are thinking during class discussions."	Teachers find it difficult to accurately perceive and interpret student thought processes, which is crucial for effective teaching.
Lack of Training	"My teacher training program did not adequately prepare me to recognize and respond to student thinking."	Insufficient training in this area limits teachers' ability to effectively engage with student thought processes.
Difficulty Interpreting Student Responses	"Sometimes I'm unsure how to interpret or build upon the answers my students provide."	This reflects a gap in skills necessary for providing meaningful feedback and fostering deeper discussions.
Large Class Sizes	"It's challenging to pay attention to the thought processes of every student when I have a large class."	Larger class sizes create barriers to individualized attention, making it difficult for teachers to engage with each student's thinking.
Relationship with Students	"I believe my relationship with students impacts my ability to understand their thinking, but I'm not always sure how to improve that connection."	Strong teacher-student relationships are essential for understanding student perspectives, yet many teachers feel uncertain about how to build these connections.
Time Constraints	"The limited time I have with each class makes it hard to delve deeply into student thought processes."	Time limitations restrict opportunities for in-depth exploration of student thinking, hindering effective engagement.
Cultural Differences	"Cultural differences between myself and my students sometimes create barriers in understanding their perspectives."	Cultural mismatches can complicate communication and understanding, affecting teachers' ability to relate to their students' thoughts.

Categories	Illustrative Teacher Statements	Interpretation
Other Challenges	"There are various other issues, such as classroom management, that distract me from focusing on student thinking."	Additional challenges can divert attention away from student engagement, indicating a need for comprehensive support strategies.

4.2. Strategies Employed by Pre-Service Teachers in Noticing Student Thought Processes

Table 3 presents a comprehensive overview of the strategies employed by pre-service teachers to engage with student thinking during English instruction. The data reveals a diverse array of approaches that these teachers utilize to create interactive and effective learning environments. One of the most commonly used strategies, accounting for (16.7%) of the comments, is collaborative learning activities.

This finding underscores the pre-service teachers' commitment to fostering an interactive classroom atmosphere where students can engage with their peers, share ideas, and learn from one another. By incorporating collaborative activities, such as group discussions, peer feedback, and team-based projects, teachers create opportunities for students to articulate their thought processes, receive feedback, and refine their understanding through social interaction. Another essential strategy, representing (13.3%) of the comments, is providing constructive feedback to students. Effective feedback is crucial for guiding student learning and helping them identify areas for improvement.

By offering timely, specific, and actionable feedback, teachers can support students in developing their skills and deepening their understanding of the material. Incorporating student interests (10.0%) and utilizing technology (10.0%) are also popular strategies among pre-service teachers. By aligning lessons with students' interests and incorporating relevant, engaging, and interactive technologies, teachers can make the learning experience more meaningful and captivating for their students.

This approach helps to maintain student motivation and attention while providing opportunities for active engagement and exploration. The use of modeling thinking processes (6.7%) and encouraging metacognition (6.7%) further demonstrate the diverse approaches teachers take to enhance student engagement. Modeling effective thinking strategies, such as think-alouds or step-by-step demonstrations, helps students understand and internalize the cognitive processes necessary for success.

Encouraging metacognition, or the awareness and regulation of one's own thinking, empowers students to monitor their learning, identify areas for improvement, and take ownership of their educational journey. Finally, the inclusion of "differentiated instruction" (16.7%) in the data indicates that pre-service teachers recognize the importance of adapting their teaching methods to accommodate the diverse needs, learning styles, and abilities of their students. By implementing differentiated instruction, teachers can provide targeted support, challenge students at appropriate levels, and ensure that all learners have the opportunity to succeed.

In conclusion, Table 3 highlights the wide range of strategies employed by pre-service teachers to engage with student thinking and create effective learning environments. By incorporating collaborative activities, providing constructive feedback, aligning lessons with student interests, utilizing technology, modeling thinking processes, encouraging metacognition, and implementing differentiated instruction, these teachers demonstrate a commitment to supporting the cognitive development of their students and fostering a culture of active learning and engagement in the English classroom.

Table 3

Strategies Employed by Pre-Service Teachers to Engage with Student Thinking

Strategy	Description	Frequency	Percentage (%)
Use of Open-Ended Questions	Encouraging students to elaborate on their thoughts and share their reasoning.	6	20.0

Strategy	Description	Frequency	Percentage (%)
Collaborative Learning Activities	Facilitating group discussions and peer interactions to promote engagement with student thinking.	5	16.7
Providing Constructive Feedback	Offering specific, actionable feedback to guide student understanding and thinking.	4	13.3
Incorporating Student Interests	Tailoring lessons and discussions to align with students' interests and experiences.	3	10.0
Utilizing Technology	Using digital tools and platforms to enhance interaction, collaboration, and engagement with student thinking.	3	10.0
Modeling Thinking Processes	Demonstrating and explaining one's own thought processes to provide students with examples and strategies.	2	6.7
Encouraging Metacognition	Prompting students to reflect on and articulate their own thinking processes.	2	6.7
Differentiated Instruction	Adapting teaching methods and resources to meet the diverse needs of students.	5	16.7
Total		30	100%

These tables collectively address the research questions regarding the challenges faced by 30 pre-service English teachers in Iran and the strategies they employ to engage with student thinking during instruction. By analyzing the data presented in these tables, we can gain valuable insights into the specific difficulties encountered by these teachers and the approaches they utilize to overcome them, ultimately informing efforts to improve teacher preparation and enhance student learning outcomes in English education.

The first table presents a quantitative analysis of the frequency and percentage of challenges reported by the pre-service teachers. This data provides a clear picture of the most pressing issues they face, allowing us to prioritize areas that require targeted training and support. The findings reveal that the most significant challenge is difficulty in recognizing student thought processes, which accounted for (33.3%) of the total comments. This suggests that many pre-service teachers struggle to accurately perceive and interpret the cognitive processes of their students in real-time during lessons.

The second most common challenge was a lack of training, representing (16.7%) of the comments. This indicates that a substantial portion of pre-service teachers feel inadequately prepared to effectively engage with student thought processes, likely due to insufficient emphasis on practical strategies for noticing and interpreting student thinking in their teacher education programs. Other notable challenges include difficulties in interpreting student responses (13.3%), managing large class sizes (10.0%), and various other factors such as classroom management issues and resource limitations (10.0%). The second table provides qualitative context to these challenges by presenting illustrative statements from the pre-service teachers themselves.

These statements highlight the challenges teachers face, such as gauging student understanding and managing large classes, underscoring the need for targeted professional development. The third table presents strategies pre-service teachers use, like technology integration and differentiated instruction, to enhance engagement and support student thinking.

5. Discussion

This study explored the challenges and strategies employed by 30 English pre-service teachers (PSTs) from four high schools in Gonbad-e-Kavous, Iran, as they engaged with student thought processes during instruction. The

findings revealed several critical challenges, including difficulties in noticing student thought processes (43.3%), lack of training (16.7%), and challenges in interpreting student responses (13.3%). Furthermore, the study identified strategies such as collaborative learning activities (16.7%) and providing constructive feedback (13.3%) that PSTs used to address these challenges.

The participants of this study comprised 30 English pre-service teachers, with ages ranging from 24 to 45 years. This diverse age range reflected varying levels of life experience and professional maturity, which appeared to influence teaching approaches and classroom interactions. The analysis revealed that older participants, who had more life experience, tended to approach classroom challenges with greater confidence and adaptability compared to their younger counterparts. For instance, older PSTs often demonstrated a more nuanced understanding of classroom dynamics, enabling them to effectively manage student interactions and interpret student responses with greater accuracy. They also appeared more comfortable addressing unexpected situations and adapting their teaching strategies in real-time. Younger participants, on the other hand, exhibited enthusiasm and creativity but often struggled with classroom management and interpreting subtle cues in student behavior.

Gender differences were also observed in the teaching strategies employed by the participants. Female pre-service teachers frequently emphasized relationship-building techniques, focusing on fostering a supportive and inclusive classroom environment. These strategies included building trust with students, encouraging open communication, and creating a sense of belonging in the classroom. Female participants often prioritized emotional connections with their students as a way to enhance engagement and learning outcomes. In contrast, male pre-service teachers tended to adopt task-oriented approaches, prioritizing the completion of instructional goals and efficient lesson delivery over interpersonal connections. Their strategies often focused on achieving measurable outcomes, such as ensuring that students completed assignments or mastered specific skills within a set timeframe. While these approaches were effective in maintaining structure and focus in the classroom, they sometimes lacked the relational depth observed in their female counterparts' methods.

These findings suggest that demographic factors such as age and gender not only shape individual teaching styles but also influence how pre-service teachers perceive and respond to student thought processes. Older participants often combined their life experience with task- or relationship-oriented strategies based on their gender, creating a unique blend of approaches tailored to their strengths. Younger participants, while less experienced, showed potential for growth in both relational and task-oriented strategies as they gained more exposure to classroom dynamics.

The most significant challenge reported by PSTs in this study was difficulty in noticing student thought processes, which aligns with findings from Barnhart and van Es (2015). Their research emphasized that novice teachers often struggle to interpret and respond to students' cognitive processes due to insufficient training in observation and analysis techniques. Similarly, Kang and Anderson (2015) highlighted that recognizing subtle cues in students' thinking requires both experience and targeted pedagogical training, which many pre-service programs fail to provide adequately.

The current study also supports Richards et al.'s (2020) findings that large class sizes exacerbate this issue by limiting teachers' ability to focus on individual students. In this study, large classes were reported as a barrier by (10%) of participants, reflecting the challenge of providing personalized attention in overcrowded classrooms.

The lack of adequate training was another prominent challenge identified in this study, consistent with Johnson and Cotterman's (2015) research. They found that many teacher education programs place insufficient emphasis on practical strategies for engaging with student thinking, leaving PSTs feeling unprepared for real-world classroom dynamics. Similarly, Richards and Robertson (2016) argued that teacher preparation programs often prioritize theoretical knowledge over practical application, which limits PSTs' ability to notice and respond effectively to student thought processes.

Difficulty interpreting student responses was another notable challenge identified by PSTs in this study. This finding adjusts with Sherin et al.'s (2009) research, which highlighted that novice teachers often struggle to build

on students' ideas due to a lack of experience in analyzing their reasoning. The inability to interpret responses effectively can hinder meaningful classroom discussions and limit opportunities for deeper engagement.

Cultural differences and time constraints were also cited as barriers by participants in this study, albeit less frequently ((3.3%) and (6.7%), respectively). Johnson and Mawyer (2019) emphasized the importance of cultural competence in teaching diverse classrooms, noting that teachers who lack awareness of students' cultural backgrounds may struggle to connect with them meaningfully. Similarly, Kang (2022) and Richards et al. (2014) highlighted how time constraints can limit opportunities for reflective teaching practices, making it difficult for teachers to engage deeply with student thinking.

Collaborative learning activities were one of the most frequently employed strategies (16.7%) by PSTs in this study. This finding consists with Sherin et al.'s (2009) research, which demonstrated that group discussions and peer interactions foster a more interactive classroom environment where students feel encouraged to share their thoughts openly.

Providing constructive feedback was another widely used strategy (13.3%), consistent with Richards et al.'s (2020) emphasis on the importance of actionable feedback in guiding student learning. Effective feedback helps students identify areas for improvement while reinforcing their understanding of key concepts.

Incorporating student interests (10%) and utilizing technology (10%) were also popular strategies among participants, reflecting efforts to make lessons more engaging and relevant for students. These findings coordinate with Kang's (2022) research on the role of technology and personalized learning in enhancing student motivation and cognitive engagement.

Modeling thinking processes (6.7%) and encouraging metacognition (6.7%) were additional strategies employed by PSTs to engage students in deeper cognitive reflection. These approaches are supported by Barnhart and van Es's (2020) work, which emphasized the value of explicitly demonstrating cognitive strategies to help students internalize effective thinking processes.

The limitations of this study are multifaceted and should be acknowledged to provide a comprehensive understanding of the findings. First, the sample size of 30 pre-service teachers from four high schools in Gonbad-e-Kavous may not be representative of all English pre-service teachers in Iran, limiting the generalizability of the results. Additionally, the reliance on self-reported data introduces potential biases, as participants may have underreported or overreported their challenges due to social desirability or lack of self-awareness. The study also focused primarily on short-term observations without exploring how the challenges and strategies identified might evolve over time as PSTs gain more experience in the classroom. Lastly, broader contextual factors, such as institutional support and access to resources, were not examined, which could further illuminate the complexities of pre-service teachers' experiences in engaging with student thinking. Addressing these limitations in future research could enhance our understanding of the challenges faced by pre-service teachers and inform more effective teacher education programs.

6. Conclusion and Implications of the Study

This study examined the challenges faced by pre-service teachers (PSTs) in recognizing and engaging with student thinking during English instruction. The findings showed that while PSTs identified students' ideas, their responses often misaligned with principles of responsive teaching. This gap highlighted the influence of traditional teaching models, which prioritized content delivery over meaningful engagement, and the lack of confidence among PSTs in facilitating discussions. Many participants reported feeling pressured to correct misconceptions rather than explore students' ideas, a practice that hindered critical thinking development and limited opportunities for deeper learning.

The findings underscored the need for teacher education programs to focus on equipping PSTs with practical strategies to notice, interpret, and act on student thinking effectively. Enhanced training programs included targeted

instruction on responsive teaching practices, classroom management in diverse settings, and strategies for fostering critical thinking skills among students. Additionally, integrating reflective practices into teacher education helped PSTs develop greater confidence in navigating complex classroom dynamics and engaging with student thought processes.

This study also highlighted the importance of addressing systemic barriers such as large class sizes, time constraints, and cultural differences that impeded effective engagement. Teacher education programs prepared PSTs to manage these challenges by providing tools for differentiated instruction, relationship-building techniques, and strategies for creating inclusive learning environments. Furthermore, policymakers and curriculum developers considered these findings when designing teacher preparation frameworks to ensure that future educators were well-equipped to meet the diverse needs of their students.

In conclusion, addressing the challenges identified in this study was crucial for developing competent educators who adapted their teaching practices to meet the diverse needs of their students in an increasingly complex educational landscape. By implementing the recommendations outlined here such as enhancing training programs, addressing systemic barriers, and fostering reflective practices teacher education institutions played a pivotal role in improving instructional quality and student learning outcomes in English education.

Acknowledgments

References

Barnhart, T., & van Es, E. A. (2015). Studying teacher noticing: Examining the relationship among pre-service science teachers' ability to attend, analyze and respond to student thinking. *Teaching and Teacher Education*, *45*, 83–93. https://doi.org/10.1016/j.tate.2014.09.005

Barnhart, T., & van Es, E. A. (2020). Developing a critical discourse about teaching and learning: The case of a secondary science video club. *Journal of Science Teacher Education*, *31*(5), 491–514. https://doi.org/10.1080/1046560X.2020.1725724

Bransford, J. D., Brown, A. L., & Cocking, R. R. (2004). *How people learn*. National Academies Press.

Campbell, J. L., Quincy, C., Osserman, J., & Pedersen, O. K. (2013). Coding in-depth semistructured interviews: Problems of unitization and intercoder reliability and agreement. *Sociological methods & research*, *42*(3), 294-320.

Cartier, J. L., Smith, M. S., Stein, M. K., & Ross, D. K. (2013). *5 practices for orchestrating productive task-based discussions in science*. NSTA Press.

Cohen, D. K., Raudenbush, S. W., & Ball, D. L. (2003). Resources, instruction, and research. *Educational Evaluation and Policy Analysis*, *25*(2), 119–142 https://doi.org/10.3102/01623737025002119

Dimova, S. (2020). English language requirements for enrolment in EMI programs in higher education: A European case. *Journal of English for Academic Purposes*, *47*, 100896. https://doi.org/10.1016/j.jeap.2020.100896

Doiz, A., Lasagabaster, D., & Sierra, J. (2013). Globalisation, internationalisation, multilingualism and linguistic strains in higher education. *Studies in higher education*, *38*(9), 1407-1421. https://doi.org/10.1080/03075079.2011.642349

Dornyei, Z. (2007). *Research methods in applied linguistics*. Oxford university press.

Dörnyei, Z. (2014). Researching complex dynamic systems:'Retrodictive qualitative modelling'in the language classroom. *Language Teaching*, *47*(1), 80-91. https://doi.org/10.1017/S0261444811000516

Dörnyei, Z., & Taguchi, T. (2009). *Questionnaires in second language research: Construction, administration, and processing*. Routledge. https://doi.org/10.4324/9780203864739

Erickson, F. (2011). On noticing teacher noticing. In M. G. Sherin, V. R. Jacobs, & R. A. Philipp (Eds.), *Mathematics teacher noticing: Seeing throug taaeeer'' eee* (pp. 17–34). Routledge. https://doi.org/10.1007/s13398-014-0173-7.2

Grossman, P., Hammerness, K., & McDonald, M. (2009). Redefining teaching, re-imagining teacher education. *Teachers and Teaching: Theory and Practice*, *15*(2), 273–289. https://doi.org/10.1080/13540600902875340

Hagenah, S., Colley, C., & Thompson, J. (2018). Funneling versus focusing: When talk, tasks, and tools work together to support students' collective sensemaking. *Science Education International*, *29*(4), 261–266.

Harris, C. J., Phillips, R. S., & Penuel, W. R. (2012). Examining teachers' instructional moves aimed at developing students' ideas and questions in learner-centered science classrooms. *Journal of Science Teacher Education*, *23*(7), 769–788. https://doi.org/10.1007/s10972-011-9237-0

Hattie, J. (2009). The black box of tertiary assessment: An impending revolution. *Tertiary assessment & higher education student outcomes: Policy, practice & research*, *259*, 275.

Hattie, J., & Clarke, S. (2018). *Visible learning: feedback*. Routledge.

Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of educational research*, *77*(1), 81-112. https://doi.org/10.3102/003465430298487

Haverly, C., Calabrese Barton, A., Schwarz, C. V., & Braaten, M. (2020). "Making space": How novice teachers create opportunities for equitable sense-making in elementary science. *Journal of Teacher Education*, *71*(1), 63–79. https://doi.org/10.1177/0022487118800706

Jacobs, V. R., Lamb, L. L. C., Philipp, R. A., & Schappelle, B. P. (2011). Deciding how to respond on the basis of children's understandings. In M. G. Sherin, V. R. Jacobs, & R. A. Philipp Eds.), *Mataaaa ticttt ccchetttt tci::: eeea tooo tccceess' yye* (pp. 97–116). Routledge.

Johnson, H. J., & Cotterman, M. E. (2015). Developing preservice teachers' knowledge of science teaching through video clubs. *Journal of Science Teacher Education*, *26*(4), 393–417. https:// doi.org/10.1007/s10972-015-9429-0

Johnson, H. J., & Mawyer, K. K. N. (2019). Teacher candidate tool supported video analysis of students' science thinking. *Journal of Science Teacher Education*, *30*(5), 528–547. https://doi.org/10.1080/1046560X.2019.1588630

Kang, H. (2022). Teacher responsiveness that promotes equity in secondary science classrooms. *Cognition and Instruction*, *40*(2), 206–232. https://doi.org/10.1080/07370008.2021.1972423

Kang, H., & Anderson, C. W. (2015). Supporting preservice science teachers' ability to attend and respond to student thinking by design. *Science Education*, *99*(5), 863–895. https://doi.org/10.1002/sce.21182

Larkin, D. (2012). Misconceptions about "misconceptions": Preservice secondary science teachers' views on the value and role of student ideas. *Science Education*, *96*(5), 927–959. https://doi.org/10.1002/sce.21022

Levin, D. M., & Richards, J. (2011). Learning to attend to the substance of students' thinking in science. *Science Educator*,*20*(2), 1–12.

Levin, D., Hammer, D., Elby, A., & Coffey, J. (2013). *Becoming a responsive science teacher: Focusing on student thinking in secondary science*. NSTA Press.

Lincoln, T. (2021). *Qualitative research*. Atla Open Press.

Luna, M. J. (2018). What does it mean to notice my students' ideas in science today? An investigation of elementary teachers' practice of noticing their students' thinking in science. *Cognition and Instruction*, *36*(4), 297–329 https://doi.org/10.1080/07370008.2018.1496919

Luna, M. J., & Selmer, S. (2021). Examining the responding component of teacher noticing: A case of one teacher's pedagogical responses to students' thinking in classroom artifacts. *Journal of Teacher Education*, *72*(5), 579–593. https://doi.org/10.1177/00224871211015980

Marzano, R. J. (2003). *What works in schools: Translating research into action*. Ascd.

Mason, J. (2002). *Researching your own practice: The discipline of noticing*. Routledge.

Richards, J., & Robertson, A. D. (2016). A review of responsive teaching in math and science. In A. D. Robertson, Scherr R., & D. Hammer (Eds.), *Responsive teaching in science and mathematics* (pp. 36–55). Routledge, Taylor & Francis.

Richards, J., Elby, A., & Gupta, A. (2014). Characterizing a new dimension of change in attending and responding to the substance of student thinking. In In J. L. Polman, E. A. Kyza, D. K. O'Neill,I. Tabak, W. R. Penuel, A. S. Jurow, K. O'Connor, T. Lee, & L.D'Amico (Eds.), *Proceedings of the International Conference of the Learning Sciences* (pp. 286–293). International Society of the Learning Sciences.

Richards, J., Elby, A., Luna, M. J., Robertson, A. D., Levin, D. M., & Nyeggen, C. G. (2020). Reframing the responsiveness challenge: A framing-anchored explanatory framework to account for irregularity in novice teachers' attention and responsiveness to student thinking. *Cognition and Instruction*, *38*(2), 116–152. https://doi.org/10.1080/07370008.2020.1729156

Robertston, A. D., Atkins, L. J., Levin, D. M., & Richards, J. (2016). What is responsive teaching? In A. D. Robertson, R. E. Scherr, & D. Hammer (Eds.), *Responsive teaching in science and mathematics* (pp. 1–35). Routledge, Taylor & Francis https://doi.org/10.1177/00224871231220604

Ruiz-Primo, M. A., & Furtak, E. M. (2007). Exploring teachers' informal formative assessment practices and students' understanding in the context of scientific inquiry. *Journal of Research in Science Teaching*, *44*(1), 57–84. https://doi.org/10.1002/tea

Schwarz, C. V., Braaten, M., Haverly, C., & de los Santos, E. X. (2020). Using sense-making moments to understand how elementary teachers' interactions expand, maintain, or shut down sense-making in science. *Cognition and Instruction*, *39*(2),113–148. https://doi.org/10.1080/07370008.2020.1763349

Schwarz, C. V., Braaten, M., Haverly, C., & de los Santos, E. X. (2020). Using sense-making moments to understand how elementary teachers' interactions expand, maintain, or shut down sense-making in science. *Cognition and Instruction*, *39*(2),113–148. https://doi.org/10.1080/07370008.2020.1763349

Sedgwick, P. (2013). Convenience sampling. *Bmj*, *347*. https://doi.org/10.1136/bmj.f6304

Sherin, M. G., Linsenmeier, K. A., & van Es, E. A. (2009). Selecting video clips to promote mathematics teachers' discussion of student thinking. *Journal of Teacher Education*, *60*(3), 213–230. https://doi.org/10.1177/0022487109336967

Singer-Gabella, M., Stengel, B., Shahan, E., & Kim, M. J. (2016). Learning to leverage student thinking: What novice approximations teacher us about ambitious practice. *The Elementary School Journal*, *116*(3), 411–436

Smit, U., & Dafouz, E. (2012). Integrating content and language in higher education. *Aila Review*, *25*(1), 1-12. https://doi.org/ 0.1075/aila.25.01smi

Stein, M. K., Engle, R. A., Smith, M. S., & Hughes, E. K. (2008). Orchestrating productive mathematical discussions: Five practices for helping teachers move beyond show and tell. *Mathematical Thinking and Learning*, *10*, 313–340 https://doi.org/10.1080/10986060802229675

Thompson, J., Hagenah, S., Kang, H., Stroupe, D., & Braaten, M. (2016). Rigor and responsiveness in classroom activity. *Teachers College Record*, *118*, 1–58. https://doi.org/10.1177/016146811611800506

van Es, E. A., & Sherin, M. G. (2021). Expanding on prior conceptualizations of teacher noticing. *ZDM—Mathematics Education*,*53*, 17–27. https://doi.org/10.1007/s11858-020-01211-4

Wächter, B., & Maiworm, F. (2014). *English-taught programmes in European higher education: The state of play in*, *15*.

Wiens, P. D., LoCasale-Crouch, J., Cash, A. H., & Romo Escudero, F. (2021). Preservice teachers' skills to identify effective teaching interactions: Does it relate to their ability to implement them? *Journal of Teacher Education*, *72*(2), 180–194. https://doi.org/10.1177/0022487120910692

Windschitl, M., Thompson, J., & Braaten, M. (2018). *Ambitious science teaching*. Harvard Education Press.
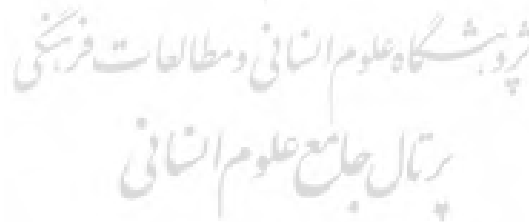
Consent Form for Participation in Research Study

Title of Research: [**The** Role of Pre-Service Teachers in Noticing Student Thinking: A Study in Iranian High Schools]
Principal Researcher: [Nadia Gharani]
Institution: [Islamic Azad University]
Contact Information: [nadia.gh1998@gmail.com]

Purpose of the Study

You are invited to participate in a research study aimed at exploring the experiences and challenges faced by pre-service teachers during their training. The goal of this research is to gather insights that will help improve teacher education programs and instructional practices.

Participation Details

What Will You Do?

If you agree to participate, you will be asked to [briefly describe what participation entails, participate in an interview].

Time Commitment:

Your participation will take approximately [insert duration, e.g., 30 minutes, 1 hour].

Voluntary Participation

Your participation in this study is completely voluntary. You have the right to refuse to participate or withdraw from the study at any time without any negative consequences.

Confidentiality

Data Protection:

All information collected during this study will be kept confidential. Your identity will not be disclosed, and any data that could identify you will be removed.

Anonymity:

The results of this study may be published in reports or academic journals, but your identity will remain anonymous.

Audio Recording

Recording Consent:

I would like to record the interview for accuracy. You may decline this option, and your participation will not be affected.

Potential Risks and Benefits

Risks:

There are no known risks associated with participating in this study.

Benefits:

While you may not receive direct benefits, your insights will contribute to the enhancement of teacher education programs, ultimately benefiting future educators and students.

Consent Statement

By signing below, you acknowledge that you have read and understood the information provided in this consent form. You voluntarily agree to participate in this research study.

Participant's Name: _____

Participant's Signature: _____

Date: _____

Researcher's Signature: _____

Date: _____

Thank you for considering participation in this study. Your contributions are valuable and appreciated!

Appendices

Appendix A: Questions Addressing Challenges and Strategies for Engaging Student Thinking in English Instruction

1. What specific challenges did you encounter when trying to notice your students' thought processes during English instruction?

2. Can you describe a particular instance where you struggled to understand a student's thinking? What factors contributed to this challenge?

3. How do you believe your training prepared you to notice and interpret student thought processes in the classroom?

4. What strategies have you employed to engage with your students' thinking during English classes?

5. Can you provide an example of a successful lesson where you effectively engaged with student thought processes? What techniques did you use?

6. How do you encourage students to express their thoughts and ideas during English instruction?

7. In your experience, what do you think are the most effective ways to support students in articulating their thoughts in English?

8. How do you reflect on your teaching practices to improve your ability to notice and engage with student thinking?

9. What resources or support do you think would help you better address the challenges you face in this area?

10. What role do you think feedback plays in helping students articulate their thinking in English classes?

11. How do classroom dynamics influence your ability to notice and respond to student thinking?

12. What role does peer collaboration play in enhancing your understanding of student thought processes?

13. Can you share an instance where a student's feedback helped you adjust your teaching strategy?

14. How do you differentiate your approach when engaging with diverse learners' thought processes?

15. What specific observational techniques do you use to capture student thinking during lessons?

16. How do technology tools assist you in recognizing and interpreting student thought processes?

17. What professional development experiences have been most beneficial in improving your noticing skills?

18. How do cultural differences among students affect their expression of thought processes in English classes?

19. In what ways do you involve students in assessing their own thinking and learning processes?

20. How do you create a classroom environment that encourages open dialogue about student thinking?