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Influencing Elementary Preservice Teacher Professional Noticing through Focused Reflections

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Abstract
This paper reports the results of a study conducted in an elementary education mathematics methods course aimed at increasing elementary preservice teachers ʹ(EPTs) level of professional noticing. Weekly reflections conducted by EPTs from tutoring sessions were video recorded and scored using the Framework for Learning to Notice Student Mathematical Thinking Rubric developed by Van E (2011) to determine the EPTs level of noticing. Participants were also asked to complete a pre- and post-reflection of their mentor teacher's classroom to assess how the noticing intervention might translate to observations in the classroom. A final component of data collection included reflections from a comparison group of EPTs. Results indicated that there were no significant changes in the tutoring reflections for the participating or comparison group of EPTs. However, the participating group of EPTs demonstrated a significant increase in their level of noticing for classroom observations, providing evidence that levels of noticing could translate between instructional settings.

Keywords: elementary preservice teachers, professional noticing, quasi-experimental, video and written reflections

Introduction

The concept of professional noticing, which refers to the "act of observing or recognizing something" which "often display similar patterns" for professionals (Sherin et al., 2011, p. xxv), has received renewed focus in recent research, particularly in the field of mathematics education as noted in reviews on the topic (König et al., 2022; Weyers et al., 2023). Professional noticing plays a critical role in teachers' level of responsiveness to their students' needs, aligning with the type of responsive instruction called for in the Common Core Standards for Mathematics (National Governors Associate Center for Best Practices & Council of Chief State School Officers, 2010; Thomas et al., 2015a; Thomas et al., 2015b).

With evidence that noticing is a skill that can be developed (Huang & Li, 2009), researchers have explored ways to help teachers develop this skill through various interventions, professional development, or coursework. Research has explored the topic of professional noticing in a variety of approaches (Amador et al., 2021; Criswell & Krall, 2017). For example, noticing has been explored through teachers participating in a lesson study (Choy et al., 2017), evaluating curriculum materials (Amador et al., 2017), and watching videos and examining student work (Jacobs et al., 2010).

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However, much of this research with preservice teachers in particular focuses on watching and discussing videos of classroom instruction. While these studies are essential for developing a better understanding of the topic, research with preservice teachers working with students adds a layer of complexity that could uniquely contribute to the field. This study endeavors to expand the understanding of professional noticing by investigating the professional noticing of elementary preservice teachers (EPTs) working directly with children as part of an intermediate mathematics methods course. In addition, this study examines how this focus on noticing in the mathematics methods course and subsequent reflections on their experiences teaching children mathematics translates to EPTs' observations and reflections from the field.

Literature Review

Previous research has emphasized the significance of noticing in various professional contexts, suggesting that different professions require specific ways of noticing (Godwin, 1994). Further, these ways of noticing relate to the specific content and can develop or change over time. Criswell and Krall (2017) make a case that a distinction between reflecting and noticing is "the recognition of and response to key teaching events in the moment, while reflection is more focused on making sense of such events after the moment" (p. 23). The authors go on to discuss the idea that noticing and reflection may be "mutually reinforcing" but that there is an "immediacy" involved with noticing where teachers can watch or rewatch instruction as it happens (p. 23). The intertwined nature of noticing and reflection make these constructs challenging to distinguish, but literature highlights the critical role that each play in developing the other.

Research has demonstrated that intentional guidance and support are necessary to develop professional noticing. For instance, van Es and Sherin (2008) emphasized the importance of guiding teachers' noticing towards students' mathematical thinking through video club activities. Similarly, Jacobs et al. (2010) posited that the act of noticing entails three parts "(a) identifying noteworthy aspects of a classroom situation, (b) using knowledge about the context to reason about the classroom interactions, and (c) making connections between the specific classroom events and the broader principles of teaching and learning" (p. 170). Thus, the development of professional noticing does not occur naturally but requires intentional nurturing and support, particularly for preservice teachers. Noticing can be developed by providing preservice teachers with guidance in identifying student thinking and supporting evidence through the use of videos (Schack et al., 2013). Decision-making also plays a crucial role in the noticing process, as Jacobs et al. (2010) and Schack et al. (2013) highlighted. According to Santagata et al. (2021), a critical step for impacting instructional practices is for teachers to respond and make decisions based on their noticing.

Researchers have employed various frameworks and approaches to make teachers' professional noticing visible (see Amador & Weston, 2024). For example, Lee and Choy (2017) adapted a framework to explore teachers' noticing through a Lesson Study, while Choy et al. (2017) developed the FOCUS Framework to examine noticing through diagnostic teaching. Another example is the Framing, Attending, Interpreting, and Responding (FAIR) Framework developed by Louie and colleagues (2021) to explore professional noticing that humanizes students through an anti-deficit approach. These studies provide insight into how noticing can be captured, and "productive mathematical noticing" can be improved (Lee & Choy, 2017, p. 463).

Theoretical Framing

The Framework for Learning to Notice Student Mathematical Thinking Rubric developed by Van E (2011) was adopted for the current study. A widely used framework in the field (Amador et al., 2021), the framework provides a means to analyze professional noticing via a rubric, which examines two strands: what teacher's notice and how teachers notice. Additionally, the categories delineate not just

what teachers notice, but their intentions based on what they notice. This rubric, along with how each category was defined, and how it was used for the study are further detailed in the Methods section. The use of the Van E (2011) framework allows for professional noticing interventions to be tested to determine their impact.

Prior research with preservice teachers (PSTs) has shown that specific intervention or programming to improve professional noticing is possible. For example, Krupa et al. (2017) found that a curricular module for improving noticing effectively increased some areas of noticing. Although that study also noted that changes in noticing were not evident for all of the PSTs, and changes did not translate to responding to mathematical thinking. Likewise, Barnhart and van Es (2015) found that PSTs' level of noticing increased, but "a high level of attention to student ideas does not guarantee high levels of analyzing or responding to those ideas" (p. 91). Much of that research approaches noticing through lesson analysis or videos. However, our study intends to build on existing literature through a semester-long project where EPTs participated in a tutoring program with children as part of their methods course. It is our hope that an added layer of interacting with children during tutoring will allow EPTs to engage more authentically in professional noticing. With this in mind, the following research questions inform this study:

1-Does participation in reflective video sessions increase EPTs' level of noticing?

2-Does participating EPTs' level of noticing differ from a comparison group of EPTs?

Methods

This quasi-experimental study (non-random group assignment but includes control and treatment groups) explores changes in the level of professional noticing among EPTs over the course of one semester in an intermediate mathematics methods course. Further details regarding the participants, data collection, and analysis are provided below.

Participants

Participants included 12 elementary preservice teachers enrolled in an intermediate mathematics methods course. Students take this course at the end of the degree program, the semester before student teaching. This course is the second mathematics methods course in students' teacher preparation program, with the previous course focused on the primary level. Students identified themselves as the following: 100% as female, 72.2% as Caucasian, 22.2% as American Indian or Alaskan Native, and 5.6% as Other. The average age of students was 21.8 years old.

A comparison group of EPTs also participated in the study and consisted of 18 students enrolled in a different section of the same methods course as the participating students. The participating and comparison group of EPTs took their intermediate math methods course the same semester but with a different instructor. Students identified themselves as the following: 100% as female, 85.7% as Caucasian, 4.8% Black, 4.8% as American Indian or Alaskan Native, 4.8% Multicultural, and 5.6% as Other. The average age of students was 22.3 years old.

Data collection

The intermediate mathematics methods course in which the study was conducted was 16 weeks in length and focused on preparing EPTs to teach 4th-8th grade (9-14 years old) mathematics content. The content of the course included effective pedagogical strategies for teaching intermediate-level mathematics, such as planning inquiry-oriented lessons, questioning and discourse, and incorporating literacy and writing into mathematics. In addition, the course is focused on preparing EPTs to understand intermediate students' mathematical thinking. The course also includes a tutoring component that occurred over a 9-week period. Tutoring is set up so that one EPT is paired with an elementary or middle

grade student to work with over the course of 9 weeks. Tutoring sessions occur once a week and are 50 minutes in length.

The first (week 1) and last week of tutoring (week 9) involved conducting an assessment (pre and post). The remaining seven weeks (weeks 2-8) entailed EPTs implementing mini-lessons that were typically broken into two or three separate activities over the course of the 50-minute period. Tutoring sessions occurred with children (between 7 and 14 years old) from the community. For tutoring sessions 2 through 8, EPTs submitted a lesson plan to be viewed by a graduate assistant, with experience teaching mathematics in the K-12 setting, a week before the planned tutoring session. Feedback was provided on the tutoring lesson plan prior to the tutoring session so EPTs could refine their plans before their tutoring session. After the tutoring sessions for weeks 2 through 8, EPTs were asked to reflect on the tutoring session. It was the reflection process that was the primary focus of this study. These reflections were analyzed to determine if the intervention implemented in the intermediate methods course and tutoring sessions would increase EPTs' level of professional noticing. With this purpose in mind, data collection occurred through two primary data sources (1) EPTs' reflections over tutoring weeks 2 through 8 and (2) EPTs' classroom observation reflection (pre and post).

EPT reflections Reflections for the participating group of EPTs occurred through video peer reflections that occurred in the methods class immediately after the tutoring session. Peer reflection teams included two or three EPTs and were formed by the instructor based on the grade level of the child being tutored. The goal was to place EPTs in teams where they were tutoring children in similar grade levels (e.g., EPTs both tutored a 3rd grade child, one EPT tutored a 4th grade child and one EPT tutored a 5th grade child). The reflection process involved the following steps:

- During the individual tutoring session between the EPT and child, EPTs recorded a segment (typically 5 to 15 minutes) of the tutoring session on an iPad, iPhone, or laptop computer.
- Immediately after the tutoring session, EPTs shared the video segment with their tutoring team.
- EPTs viewed their team member's video segment prior to their next methods course.
- In the methods class session immediately following the tutoring session, tutoring teams were provided time to record a peer reflection on an iPad, iPhone, or laptop computer.
- The reflection video was uploaded to a shared folder with the instructor and the research team.

There were seven peer reflection sessions (Session 1 – Session 7). During each of the sessions, EPTs were provided a prompt and/or reflection activities activity focused on professional noticing. Session 1 and Session 7 only included the primary prompt "What did you notice" to guide EPTs as they recorded their peer reflection videos. The reflection protocol that occurred throughout the seven weeks is included in Appendix A.

Reflections for the comparison group of EPTs remained the same as in previous semesters. EPTs were asked to complete an individual written reflection to be submitted to their instructor within a week of their tutoring session. The assignment details to guide EPTs' reflections are included in Appendix B.

Teacher observation reflections. In addition to wanting to explore EPTs' level of professional noticing as they reflected on tutoring sessions, we wanted to explore how professional noticing might translate to the EPTs' field experience in an elementary classroom setting as well. This was done by asking EPTs to individually observe one mathematics lesson with a mentor teacher in the field and submit a written reflection to the prompt: "what did you notice." Both the participating and comparison groups of EPTs were asked to complete this observation reflection at the beginning (pre) and end of the semester (post).

Table 1.
Data Collection Summary

	Beg. Sem.	Wk 1	Wk 2 S1	Wk 3 S2	Wk 4 S3	Wk 5 S4	Wk 6 S5	Wk 7 S6	Wk 8 S7	Wk 9 S7	End Sem.
Part. EPTs	TO	VTR	VTR	VTR	VTR	VTR	VTR	VTR	VTR	VTR	TO
Comp. EPTs	TO	TR	TR	TR	TR	TR	TR	TR	TR	TR	TO

Note. Part. = participating; Comp. = comparison; Beg. Sem = Beginning of the semester; End Sem. = End of the semester; Wk = Week; S = Session; TO = Teacher Observation; VTR = Video Teacher Reflection; TR = Tutoring Reflection

Analysis

In order to determine the level of professional noticing for written and video reflections as well as the written observation, the van Es (2011) framework for professional noticing of student mathematical thinking rubric was used. This rubric was divided into two categories, what teachers notice and how teachers notice. Each of these categories included four levels: Level 1 (Baseline), Level 2 (Mixed), Level 3 (Focused), and Level 4 (Extended).

- **Baseline** is evidence by EPTs attending to student behavior, the environment, and/or to teacher instruction. In addition, EPTs would be vague in responses without providing specific evaluative comments or support.
- **Mixed** would be evident through comments that mostly focused on teacher instruction with some comments about students' mathematical thinking and behaviors. While EPTs might provide some details about specific events or evaluative or interpretive comments, these ideas are comments are fairly general.
- **Focused** is primarily focused on students' mathematical thinking with specific detail and support provided, including interpretive comments and discussion of interactions and events.
- **Extended** is focused on students mathematical thinking, such as strategies, and the connection between student thinking and teaching strategies used. In addition, EPTs would not only discuss key events and make interpretive comments, but also elaborate on these comments, making connections between the events and principals of teaching and learning as well as proposal alternative instructional strategies.

Four members of the research team individually coded a subset of the video and written reflections before meeting as a team to discuss codes until consensus was reached. Several of these meetings occurred to ensure consistency in coding. Finally, the rest of the reflections were divided into two sets. Two members of the team individually coded the reflections and met to discuss until consensus was met for both sets of reflections. Although codes were assigned to segments of text (written or transcribed from videos), an overall code was given to each document based on the four levels of noticing. Table 2 provides examples of how statements were coded according to these four levels. Another by-product of research team meetings was to develop a protocol to assist with scoring videos (Appendix C).

In order to address research questions 1 and 2, a descriptive overview was provided with mean scores computed for each week. Additionally, a Wilcoxon Signed-Rank test was performed to determine if there was a significant difference between student levels of noticing from the beginning to the end of the semester. Because there is some natural variance in noticing, the Wilcoxon test was conducted by averaging the mean level of noticing scores for the first three weeks of reflections (pre) and the last three weeks of reflections (post). This same method was applied for the comparison group of scores to answer research question 2. Only one pre and post classroom observation was collected.

Table 2.
Example Statements for Four Levels of Codes

Baseline (1)	Mixed (2)	Focused (3)	Extended (4)
• V – She did well with the activity • V – I noticed he was really enjoying it, I felt like. • W – She really loved this game and was engaged the whole time. • W – We did not get it completed because it was challenging, but from what we did get done he did well.	• V – We're not understanding common denominators; we're still at the basics. • V – He's actually understanding that 3 x 4 = 12, and he would be like 4 + 4 + 4 = 12. • W – The fractions/decimals she struggled with most were 1/3 and 2/3. • W – The student realizes that 1/5 is bigger than 1/5 because in 1/5 the sections are larger.	• V – He knows how to use benchmarks, but he doesn't know how to use the why behind it. • V – She started making the connection and realized that 1 hexagon was 6 triangles. • W – Just looking at a fraction outside of any context, just the fraction, she can tell me which is the while and which is half, but within a context, she gets confused. • W – I noticed when the student encountered fractions that were similar in size and harder to compare he used the fraction tiles to compare the two.	• V – If you had a cookie and split it down the middle then he could see that it is half, since you can't show this with a cube so he's not understanding a half. • V – Using benchmarks on the number line could help him, if you start at ½, ¼, and then go back to 1/3. • W – I would also change the estimating and ordering fractions activity so that there was more of a context to it and to include more complicated fractions, such as 2/3 and ¾. • W – I would continue working within fractions within a context so that she knows how to manipulate them to solve a word problem.

Note. V = video reflection; W = written reflection

Results

To address the first research question, we first examined how the mean level of noticing for the participating EPTs changed throughout the seven-session reflections that were completed during the semester. Figure 1 provides an overview of these means.

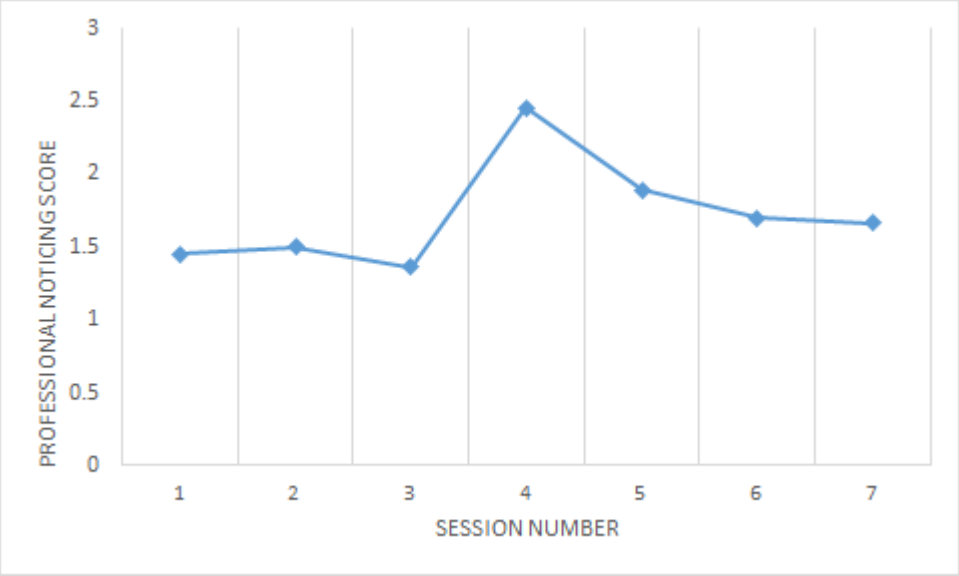

Figure 1. Mean level of noticing with participating EPTs' video reflections

While little change seems to be evident over the first three sessions, regardless of the protocol change for reflecting in session 3, a sharp increase in the mean level of noticing for EPTs is seen for session 4. Immediately preceding peer reflection for session 4, EPTs were asked to review a script of two EPTs reflecting on a tutoring session. The script was pulled from a conversation held between two EPTs in a previous semester as they reflected on their tutoring sessions and was selected due to the focused and extended level of noticing evident in the example. After students were given time to read the script, a class discussion was held focused on the three provided prompts. The students were then given the same prompts provided during the reflection session the previous two weeks. There is also a drop and leveling off in the mean level of professional noticing for sessions 5 through 7. This occurred despite the protocol used to encourage higher levels of professional noticing during these weeks. To further investigate whether or not there was a significant change in the level of professional noticing, a Wilcoxon Signed-Rank test was conducted. Results indicate that while there was a mean increase in the mean from 1.50 to 1.72, this difference was not significant (p = .137; see Table 3). To further explore whether the possible changes in EPTs' level of professional noticing translated to reflections on classroom practice during field observations, a Wilcoxon Signed-Rank test was conducted with the pre and post observation reflections. Results indicated a significant increase (p = 0.020) in EPTs' level of noticing from 1.08 to 1.58 (see Table 3).

Table 3.
Results of Wilcoxon Signed-Rank Tests for Video Reflections and Classroom Observation

	Mean (SD) Pre	Mean (SD) Post	p-value
Video Reflections	1.50 (.36)	1.72 (.31)	.137
Classroom Observation	1.08 (.29)	1.58 (51)	.020

To address the second research question, the mean level of noticing was compared in Figure 2 for the participating and comparison group of EPTs.

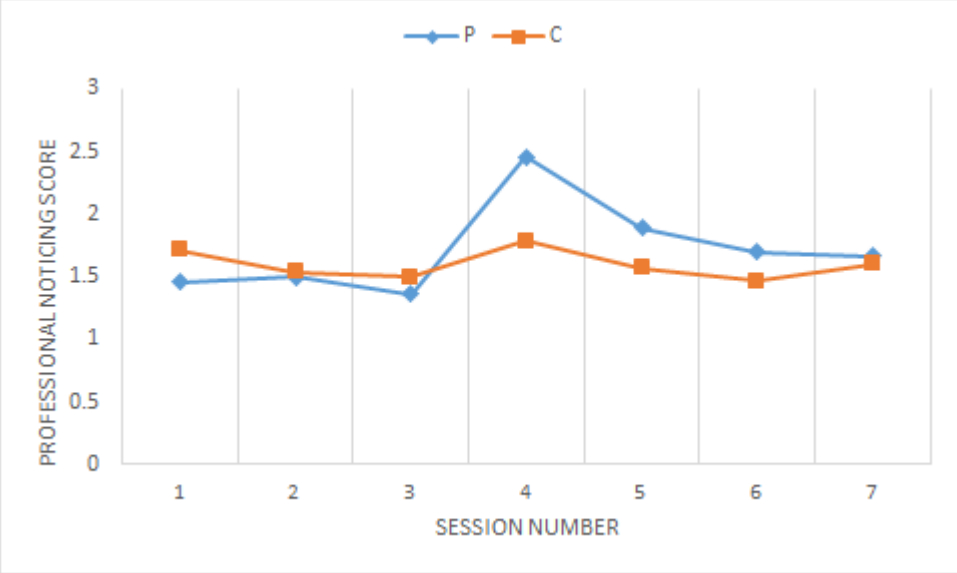

Figure 2. Mean level of noticing with participating and the comparison groups of EPTs' video and written reflections. *Note.* P = participating; C = comparison

Although there was some fluctuation in the level of professional noticing for the comparison group of teachers, the level of noticing seems to be fairly consistent across the 7 session reflections. To further assess if there was a change in the comparison group of EPTs' level of noticing, a Wilcoxon Signed-Rank test was conducted. Results indicated no significant change (p = .752) in the comparison group of EPTs' level of noticing with an initial mean of 1.59 and a final mean of 1.57, see Table 4.

Table 4.
Results of Wilcoxon Signed-Rank Tests for Participating and Comparison EPTs

	Mean (SD) Pre	Mean (SD) Post	p-value
Participating	1.50 (.36)	1.72 (.31)	.137
Comparison	1.59 (.42)	1.57 (.53)	.752

To further assess differences between the comparison and participating group of EPTs, a Wilcoxon Signed-Rank test was conducted for the classroom observations (TO), see Table 5.

Table 5.
Results of Wilcoxon Signed-Rank Tests for Participating and Comparison EPTs

	Mean (SD) Pre	Mean (SD) Post	p-value
Participating	1.08 (.29)	1.58 (.51)	.020
Comparison	1.11 (.32)	1.33 (.49)	.072

Although there was an increase in the mean level of noticing for the comparison group of EPTs (1.11 to 1.33), this increase was not statistically significant (p = .072). However, the increase in the participating group of EPTs' level of noticing was statistically significant (p = .020), with the participating EPTs having a slightly lower mean level of noticing than the comparison group of EPTs initially but a higher mean level of noticing for the second observation, see Figure 3.

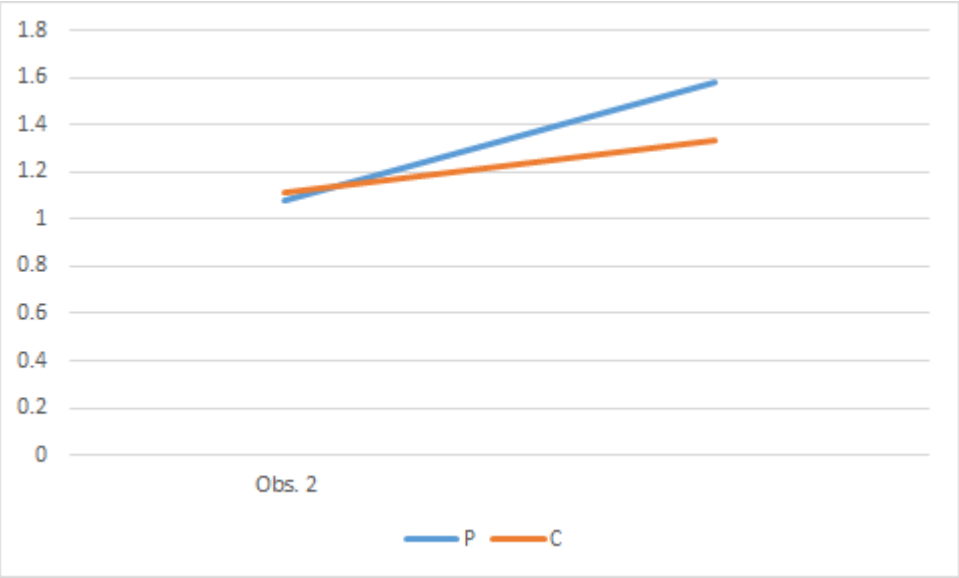

Figure 3. Mean level of noticing with participating and the comparison groups of EPTs' classroom observation. *Note*. P = participating; C = comparison

Discussion

Preservice teacher preparation programs embed a significant amount of teacher observation time into their programs. Brophy (2004) and Star and Strickland (2008) posited that it is not clear what preservice teachers learn from these observations. Providing opportunities for preservice teachers to focus their attention on key features of mathematical thinking while observing is critical to their development as teachers (Berliner et al., 1988; Star & Strickland, 2008). Thus, the purpose of this study was to explore an alternative way of building EPTs' professional noticing through a tutoring experience with K-8 grade children. Through peer reflections of tutoring sessions that they planned and implemented, the hope was to make these reflections more meaningful and useful in guiding future tutoring sessions. In addition, specific protocols to help EPTs engage in professional noticing, students were assigned to grade-based teams to engage in noticing discussions. The findings of this study revealed a significant increase in the mean level of noticing among the participating EPTs over the course of the seven session reflections. However, the increase in noticing was not consistent throughout the semester, with a sharp increase observed after the fourth session but a drop and leveling off in the subsequent sessions. These findings suggest that certain interventions, such as reviewing scripts of reflective conversations and engaging in class discussions, can positively impact the development of professional noticing among EPTs. However, we did not see a sustained significant increase in the level of noticing evidence by weekly video tutoring reflections. Future work would need to explore how this particular component of an intervention could create this sustained increase in professional noticing. The observed increase in noticing aligns with prior research (Borko et al., 2008; Jacobs & Spangler, 2017; Sherin & van Es, 2005; van Es & Sherin, 2008; Santagata et al., 2021; Schack et al. 2013; Star & Strickland, 2008) that highlights the importance of intentional nurturing and support for developing professional noticing skills among preservice teachers. The findings also support the notion that noticing and reflection are mutually reinforcing (Criswell & Krall, 2017), as the increased level of noticing may have been influenced by the reflective conversations and discussions that occurred in the mathematics methods course.

Additionally, we explored how the professional noticing focus in the methods course might translate to EPTs observations in the field. A Wilcoxon Rank Sum test found a significant increase in participating EPTs professional noticing with the teacher observations but did not find a significant change in professional noticing with the comparison group of EPTs. This finding provides initial

evidence that attention to professional noticing in a mathematics methods course may positively impact EPTs ability to transfer that skill to a classroom setting.

Limitations and future research

It is important to acknowledge the limitations of this study. The sample size was relatively small, which may limit the generalizability of the findings. Future research should aim to replicate the study with a larger and more diverse sample to ensure the robustness of the results. Additionally, the study focused on EPTs in an intermediate mathematics methods course, the second of two elementary mathematics methods courses in the elementary education program, and the findings may not necessarily apply to other teacher preparation programs with only one methods course or to other subject areas. Further research should explore professional noticing in different contexts and among teachers at various stages in their careers. Future research could also investigate the relationship between the level of noticing and the actual instructional decisions made by preservice teachers. While this study focused on the development of noticing skills, it is crucial to examine how these skills translate into responsive teaching practices and student learning outcomes.

Conclusions and implications

The results of this study have several implications for teacher preparation programs and professional development initiatives. First, the inclusion of a tutoring component in an intermediate mathematics methods course can enhance the development of professional noticing skills among EPTs. The experience of working with elementary students in a tutoring setting allows EPTs to directly observe and respond to students' mathematical thinking, which is a crucial aspect to effective teaching (Jacobs & Spangler, 2017; Star & Strickland, 2008).

Second, the use of reflective video sessions and peer discussions can be an effective strategy for promoting professional noticing (van Es, 2011). Reviewing video segments of tutoring sessions and engaging in reflective conversations with peers provides opportunities for EPTs to critically analyze their teaching practices, identify noteworthy aspects of classroom interactions, and make connections between specific events and broader teaching and learning strategies and practices.

Third, the findings highlight the importance of providing explicit guidance and scaffolding in developing professional noticing abilities. Interventions such as reviewing scripts of reflective conversations and engaging in class discussions can serve as valuable tools for enhancing EPTs' level of noticing. Additionally, prior work notes that preservice teachers' level of noticing can also be influenced by when in the reflection occurs, such as before or after a teaching episode (Yilmaz & Ozdemir, 2023). Teacher educators and professional development facilitators should incorporate these strategies into their programs to support the development of professional noticing skills among teachers.

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Appendix A

Peer Video Reflection Protocol

Session 1 Reflection:
Respond to the question - What did you notice?

Session 2 Reflection:
Respond to the question - What did you notice?

Session 3 Reflection:
Respond to the questions –

- What did you notice about student thinking and strategies being used?
- What are some specific examples that support your thoughts?

Session 4 Reflection:
Before session begins, give students a script or two EPTs reflecting on a tutoring session to read through and have them discuss:

- What did the two students reflecting notice about student thinking?
- What type of support was provided for statements?
- What were some of the conclusions reached based on what was noticed?

Have students do their reflection, responding to the questions:

- What did you notice about student thinking and strategies being used?
- What are some specific examples that support your thoughts?

Session 5 Reflection:
EPTs bring student work with them to discuss during your reflection session.
Have EPTs do their reflection, responding to the questions:

- What did you notice about student thinking and strategies being used?
- What are some specific examples that support your thoughts?

Session 6 Reflection:
EPTs prepare for a parent-teacher conference for this student:

- Summarize where the student is at with their mathematical learning.
- Think about what a parent will want to hear.
- What suggestions might you have for the parent?

Have EPTs do their reflection, responding to the questions:

- What did you notice about student thinking and strategies being used?
- What are some specific examples that support your thoughts?

Session 7 Reflection:
Respond to the question - What did you notice?

Appendix B

Individual Written Reflections

After each tutoring session (session 2-9), you will write a brief narrative reflecting on your tutoring session. Each typed weekly reflection should include the following:

- BRIEF summary of the mathematics explored with the child. (In other words, note the activities you worked on during the tutoring session.)
- The child's reactions – with what the child still struggles, and the child's successes, and how this impacted the lesson you prepared for the session;
- Think about the tutoring session - if all the activities centered around one topic, describe what the child did well and with what they are having difficulty;
- **Support your statements** with vignettes of what happened;
- Paint a picture of your tutoring session;
- If there was an activity that the child was bored with, didn't like, or really enjoyed, discuss this.
- What you need to work on during the next tutoring session with the child;
- Based on what you have just written, what does your tutee need to work on next?
- How did the activities you planned work out? What would you do differently next time to help your tutee (or another child) learn the concepts or mathematical ideas presented in the lesson?
- What did **you** learn today about yourself as a teacher? (e.g., questioning techniques, wait time, reactions to student's responses, attitude, organization, planning, etc.)
- What questions do you have for me or others in class that are tutoring a child at the same ability level? Answer here but also bring these to class and you will discuss this with your group.
- During the tutoring session you will need to make observational notes on your lesson plan to aide you in reflecting about the tutoring session. Please remember that this is NOT A SUMMARY.

Appendix C

Scoring protocol for noticing videos

1. Please use the rubric below to assess students' level of noticing. You will be assigning a summative score based on your analysis of the video across time.
2. Complete the table below as you move through the video. Feel free to add or delete cells as you need. You may leave cells blank if it does not apply (student is not talking during this time interval).
3. Provide justification for the summative score you provided. In addition, provide at least 2 quotes and a time stamp to support your score (e.g., I scored Suzy at a level 1 because she focused on global ideas without ever relating it to specific student strategies or providing examples, even of her own pedagogy. For example, "It was a good lesson; I would do these activities again with equivalent fractions").

Time (s)	0-15	16-30	31-45	46-60	61-75 (1 min.)	76-90	91-105	106-120	121-135 (2 min.)	136-150
Score										

Time (s)	151-165	166-180	181-195 (3 min.)	196-210	211-225	226-240	241-255 (4 min.)	256-270	271-285	286-300
Score										

Time (s)	301-315 (5 min.)	316-330	331-345	346-360	361-375 (6 min.)	376-390	391-405	406-420	421-435 (7 min.)	436-450
Score										

Time (s)	451-465	466-480	481-495 (8 min.)	496-510	511-525	526-540	541-555 (9 min.)	556-570	571-585	586-600
Score										

Justification:
Quotes (with timestamp):