

Mathematics teacher educators' microteaching implementations: selection of settings and approaches to assessment and feedback for prospective primary teachers

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This study investigates microteaching in mathematics method courses, focusing on how mathematics teacher educators (MTEs) prepare primary teachers for teaching mathematics. We surveyed 65 MTEs across 71 Turkish universities, examining their approaches to topic selection, session settings, and assessment and feedback in microteaching. We found a preference for MTE-led topic selection and peer-based teaching sessions. Most MTEs tailor evaluation rubrics to individual needs, emphasizing a personalized assessment and feedback process. Furthermore, revealing evaluation criteria before sessions were noted to improve feedback transparency. The study underscores the impact of these practices on formative assessment and feedback.

Keywords: Microteaching, Mathematics methods courses, Mathematics teacher educators.

Introduction

Primary teachers are essential in developing foundational skills in learners during critical learning periods. Unlike specialized subject teachers, primary teachers cover a range of disciplines, including literacy, social studies, and mathematics. To prepare them, teacher training programs include method courses that focus not only on subject knowledge but also on effective teaching strategies and creating supportive learning environments (Strawhecker, 2005). Recognizing the importance of these courses, we conducted an in-depth study on the structure of mathematics method courses managed by MTEs. This paper presents our preliminary analysis and insights into microteaching within these courses from the MTEs' perspectives. We explore how these practices influence formative assessment and feedback, which are crucial for nurturing teacher candidates and achieving broad educational objectives of enhancing mathematical teaching skills (Bosica et al., 2021). This study addresses two main research questions: (1) Why do/ don't MTEs employ microteaching in method courses? and (2) How do MTEs structure the implementation of microteaching?

Literature review: microteaching in teacher preparation

Microteaching is a key component in teacher education, renowned for its effectiveness in improving teaching skills and easing the shift from theory to practice. It creates a simulated environment that enhances practical teaching abilities—like concept explanation, material preparation, and performance analysis—in small groups, as highlighted by Brown (1976). It also builds essential competencies for effective mathematics instruction (Dayal & Alpana, 2020; Cheng, 2017) and boosts self-efficacy and confidence in teacher trainees. Peker (2009) notes that microteaching significantly reduces teaching anxiety, improving confidence in lesson delivery. Batten (1979) and Majoni (2017) describe it as a method that focuses on specific skills, shortens teaching time, and reduces class size,

effectively linking theoretical knowledge with actual teaching. Additionally, Elias (2018) stresses that microteaching facilitates feedback for behavioral change in candidates, adapting to individual needs and promoting a focused environment for skill development.

Microteaching's effectiveness largely stems from the tailored feedback it provides, which enhances teaching competencies. Brodsky and Doherty (2010) highlight feedback's crucial role in fostering learning and self-assessment, helping trainees identify their strengths and areas for improvement. Zhongji (2006) also notes that incorporating student feedback into microteaching significantly boosts teaching skills, making the training more efficient. Beyond skill development, feedback enhances motivation and interest among trainees, as noted by Özcan and Gerçek (2018). Peer feedback in microteaching can influence perceptions of 'good teaching', focusing on presentation and style, which affects evaluation processes (Vander Kloet & Chugh, 2012). Additionally, Mathew (2018) shows that feedback in microteaching creates a psychological environment conducive to improvement.

Building on these insights, Saraçoğlu and colleagues (2018) highlight that microteaching enables pre-service teachers to assess their own teaching proficiency in mathematics, providing a critical platform for self-critique and peer feedback. This reciprocal feedback process, as Semerci (2000) points out, not only enhances prospective teachers' self-evaluation skills but also improves their teaching performance through insights from peer evaluations. Learning from peers helps prospective teachers refine their teaching methods. These collective findings underscore microteaching's vital role in evaluating and enhancing teaching competencies, especially in mathematics, preparing teacher candidates for their future roles. Thus, microteaching is essential both as a feedback mechanism and a preparatory tool, contributing significantly to the candidates' professional readiness.

Methods

In this study, we share a portion of our broader research that explores six key areas in the design and structure of mathematics method courses within primary teacher education programs: the objectives, content delivery approaches, the design of teaching-learning situations, assessment and evaluation, collaborative endeavors, and research activities. To address each dimension, a mixed-methods survey comprising both open and closed-ended questions was crafted.

This study focuses on responses related to assessment and evaluation in microteaching, inspired by a literature review on diverse microteaching approaches (Mukuka & Alex, 2024). Three main characteristics of microteaching—planning, teaching in varied settings, and the evaluation-feedback cycle—were identified and reflected in the survey questions tailored to each aspect. Initially, the survey investigates whether MTEs include microteaching in their programs and their reasons for its inclusion or exclusion. Regarding planning, it queries how MTEs assign microteaching topics, from predetermined topics to allowing candidates to choose, including other possible methods. For the teaching settings, it asks about the intended audience, whether it is a real classroom, peers, a combination with video analysis, or other settings. Concerning evaluation, the survey explores if MTEs use a rubric for assessing microteaching and how these rubrics are sourced. It also examines the use of the evaluation tool, such as whether criteria are shared with candidates beforehand, if assessments are conducted solely by the MTE, or if peer evaluation is involved.

The participants of our study consisted of whole groups of MTEs who were responsible for teaching the mathematics method course within the primary teacher undergraduate programs at education faculties across Turkey. The target population consisted of 90 academics at 71 universities to whom the survey was sent via email. Responses were received from 73 MTEs, and out of these, 65 provided complete answers to all the questions in the survey. The remaining 8 indicated that they could not participate due to various reasons, such as being new to the course. Overall, the sample of 65 participants out of the population of 90 indicates a 72.22% representativeness.

The responses provided by MTEs in the survey underwent both qualitative and quantitative analyses. For the qualitative part, we focused on the open-ended responses, where reasons cited by participants were grouped under common themes to identify the underlying motivations for either implementing or refraining from microteaching in their courses. Quantitatively, the answers to the remaining survey items were scrutinized using descriptive statistics, with a particular emphasis on frequency counts. This analysis helped pinpoint prevailing trends regarding the selection of topics, the settings chosen for teaching, and the employed strategies for evaluation and feedback, providing a comprehensive overview of the current practices among MTEs.

Findings

Findings regarding the first research question

Findings related to the first research question revealed that out of 63 MTEs who responded to the open-ended question about the inclusion of microteaching practices in mathematics teaching courses, 2 left the questions unanswered. For those MTEs (n=50) who reported implementing microteaching, their objectives for providing feedback were categorized into six distinct themes. While several MTEs' responses spanned multiple themes, others were associated with a single theme exclusively.

Table 1: The reasons for implementing microteaching

Theme	n	Sample quotations
Putting theory into practices	27	<i>I have them do microteaching so that the theoretical knowledge they have learned can be implemented</i>
Improving trainee self-assessment	15	<i>It reduces their anxiety about giving a presentation. It provides instant feedback. Contributes to the development of evaluation and self-assessment skills</i>
Planning and preparations	10	<i>I think the best way to find answers to questions such as how to plan a lesson, how well they comply with this plan.</i>
Developing instructional skills	9	<i>I use it to provide an opportunity for teacher candidates to try their teaching skills, to see the mistakes and deficiencies they make during this time, and to correct them and try again.</i>
Developing subject matter knowledge	5	<i>Teacher candidates develop their own missing or additional subject knowledge by teaching.</i>
Developing classroom Management skills	4	<i>To gain awareness and experience in classroom management, to get to know students more closely and to have real classroom environment experiences.</i>

Examining Table 1 reveals that "putting theory into practice" is the predominant theme among the feedback topics MTEs address through microteaching for teacher candidates. This indicates a significant focus on the application of theoretical knowledge within practical teaching scenarios. Conversely, for the teacher educators who do not implement microteaching practices (n=13), the analysis yielded three distinct codes. These codes, which capture the reasons behind the absence of microteaching in their programs, are detailed in Table 2.

Table 2: The reasons for refraining from Microteaching

Codes	n	Sample quotations
Time constraints	6	<i>Incorporating practical applications into class time requires serious time.</i>
Excessive course load	3	<i>The most important reason is my high course load.</i>
Class size	4	<i>I think the classroom environment and class size are not suitable for a microteaching application</i>

Findings regarding the second research question

In this section, we present quantitative analysis regarding the second research question, more specifically, the methods MTEs use to deliver microteaching topics, the environments they prefer to conduct these sessions, the rubrics they use for assessment, and the evaluation and feedback approaches. The findings are presented in Table 3.

Table 3: MTEs' preferences to structure the microteaching

Category	Choices	n
MTEs' preferences of topic selection for microteaching	I determine the topics myself and distribute them to prospective teachers	28
	Prospective teachers decide on the topic of their choice	16
	Other	6
Preferred settings for microteaching implementations	Teaching in front of prospective teachers	34
	Teaching in real classroom environment and video recording and then showing it to prospective teachers	9
	Teaching in front of students in real classroom environment	7
Methods employed to create evaluation rubrics	I prepare it myself	26
	I adapt the existing	11
	I use ready-made	3
Preferences of MTEs in sharing evaluation criteria	I show the criteria to the prospective teachers in advance and evaluate them myself	27
	The prospective teacher is evaluated by his/her peers as well as myself.	16

With regard to choosing topics for microteaching sessions, a significant portion of MTEs (28 out of 50 respondents) opt to select the topics themselves to distribute to teacher candidates. In contrast, a smaller subset of 16 MTEs allows the candidates to choose their own topics.

As for the preferred settings for microteaching, a majority of the MTEs (34 out of 50) favor having teacher candidates conduct sessions in front of their peers. This method is more popular than teaching in a real classroom environment, which only garnered 7 responses, while 9 MTEs showed a preference for a combined approach where candidates teach in a real classroom and then review a video recording of their performance.

In terms of the assessment rubrics used for microteaching, most MTEs (26 out of 40) craft their own evaluation tools, indicating a trend towards tailor-made assessment strategies. Meanwhile, 11 MTEs adapt existing rubrics, and only 3 utilize pre-made rubrics without any alterations, underscoring the inclination towards personalized evaluation methods in microteaching.

With respect to the use of rubrics for evaluating microteaching sessions, the prevalent method among MTEs, with 27 indications, involves sharing the evaluation criteria with teacher candidates in advance, followed by the MTE conducting the assessment. A minority of 7 MTEs, however, choose not to reveal the criteria before the session and proceed with an independent evaluation. Additionally, 16 respondents incorporate peer feedback into the assessment process, combining it with their own evaluations.

Discussion

Discussion of research question one

Our study highlights the objectives behind MTEs' use of microteaching, primarily to transform theoretical knowledge into practical teaching application, bridging an important educational gap. This practice echoes Brodsky and Doherty's (2010) emphasis on the importance of effective feedback for the development of teacher candidates, as it helps them identify strengths and improvement areas. MTEs value "Improving self-assessment," in line with Zhongji's (2006) findings on the benefits of student feedback. Microteaching serves the dual purpose of honing teaching skills and fostering reflective practices, crucial for professional growth. MTEs also employ microteaching for comprehensive teacher preparation, including "Planning and preparations," "Developing instructional skills," "Development of subject matter knowledge," and "Classroom Management," recognizing the multifaceted nature of teaching and the diverse competencies required (Mathew, 2018). Drawing on insights from Saraçoğlu et al. (2018) and Semerci (2000), our findings argue that microteaching transcends a mere training approach, standing out as a critical, feedback-centric process that substantially contributes to teacher readiness. MTEs intentionally create a collaborative environment that bolsters peer learning and growth. Through microteaching, MTEs not only teach but also build a dynamic space for pre-service teachers to practice, reflect, and evolve, with feedback as a central element of this transformative experience.

Discussion of research question two

In this section, we discuss three aspects of microteaching—topic selection, preferred settings, and evaluation and feedback approaches.

Topic Selection

Our findings illuminate a pronounced inclination among MTEs to dictate microteaching topics, thereby exerting considerable influence over the trajectory of learning experiences and the nature of feedback provided to students. By selecting the topics, as we see it, MTEs are implicitly endorsing certain instructional priorities and competencies that they deem essential for prospective teachers to develop. This practice may, however, inadvertently narrow the scope of prospective teachers' potential growth. There is a potential risk that the feedback becomes tailored to a specific set of topics and attributes, potentially at the expense of a more holistic instructional approach that includes adaptability, responsiveness and pedagogical creativity. Moreover, Benton-Kupper (2001) underscores the value of microteaching as a scaffolded platform that enhances pre-service teachers' skills by offering them a space to engage in teaching practices and receive targeted feedback. The MTEs' involvement in topic selection is critical in this context, as it directs the areas of teaching that are emphasized and scrutinized. This deliberate guidance can have profound implications for the development of teaching skills, as it can ensure that feedback is specific, actionable, and aligned with the MTEs' vision.

Setting for microteaching

Our study indicates a significant inclination for conducting microteaching sessions in peer-based settings within a controlled environment, rather than directly within the real-world primary classroom context. Educators prefer these settings to facilitate a stable and secure environment where trainee teachers can develop their skills away from the complexities and unpredictability that come with an actual classroom (Benton-Kupper, 2001). This approach prioritizes an atmosphere conducive to formative feedback that is both immediate and specific, without the distractions and challenges that a typical primary classroom might impose. The benefit of such targeted and immediate feedback has been noted for its positive effects on the professional development of teacher candidates (Hidayah & Indriani, 2021). Nonetheless, it is recognized that feedback derived from a peer-based setting may inherently differ from that garnered in a real-classroom scenario. In a true classroom setting, feedback is not only prompt but also enriched by the real-life dynamics of classroom interaction, which is vital for fostering a teacher's ability to adapt and develop responsive teaching techniques (Sen, 2009). Traditional microteaching sessions in a university setting, with the oversight of MTEs, attempt to bridge the gap between educational theory and practice (Cheng, 2017), but still, they fall short of emulating the full spectrum of challenges in a primary classroom. Reflecting on this limitation, some researchers advocate for integrating microteaching sessions into actual primary classrooms to provide teacher candidates with a comprehensive and authentic teaching experience (Peker, 2009).

Evaluation and feedback approaches

Our findings show that most MTEs prefer to design or tailor their evaluation rubrics, highlighting the importance of context-specific, learner-centered feedback for improving student understanding and informing teacher insights on teaching effectiveness (Haug & Ødegaard, 2015). MTEs commonly

share evaluation criteria with candidates beforehand, promoting transparency and structure in the feedback process. This approach supports Megawati's (2018) findings that peer assessments in microteaching enhance teaching skills by boosting confidence within a supportive learning atmosphere. Moreover, the use of feedback forms significantly influences teacher candidates' notions of effective teaching and may affect their self-concept and teaching approaches, as noted by Vander Kloet and Chugh (2012). In contrast, a smaller group of MTEs who choose not to disclose criteria prior to teaching might aim to encourage an independent assessment of teaching abilities, potentially leading to the development of more spontaneous teaching skills. This feedback strategy may lead candidates to display a wider array of teaching behaviors, contributing to a more comprehensive development, suggesting a need to refine evaluation methods to better support educational objectives.

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