

Authentic Assessment in Action: Strengthening Teaching Self-efficacy among Pre-service Science Teachers

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Abstract

This study examines the influence of implementing selected authentic assessment tasks on pre-service science student teachers level of teaching self-efficacy. A non-equivalent pre-test and post-test control group quasi-experimental design was employed to answer the research question. 60 pre-service science teachers from two intact groups who enrolled in general methods of teaching course were participated in the study. The two groups were assigned into experimental group (N=30) and control group (N=30) based on their existing groups randomly (as group- A control and B experimental group). Participants in the experimental group were assessed with three authentic assessment strategies for six weeks, while those in control group were assessed with conventional strategies. Pre and post Ohio State Teacher Efficacy Scale were used to gather data to examine whether there was a significant difference between the two groups. The quantitative data were analyzed using descriptive statistics (mean and standard deviation) and inferential statistics (independent sample t-test, paired sample t-test and One- Way Analysis of Covariance (ANCOVA). Semi-structured interviews were also conducted with experimental group students to complement the quantitative data. The results indicated that authentic assessment strategies significantly enhanced student teachers' teaching self-efficacy. The interview results also revealed that exposing student teachers authentic assessment strategies was motivating and contributed to enhancing participants' teaching self-efficacy. Therefore, it is recommended that authentic assessment strategies should be integrated into the teacher education curriculum and embedded in to courses to enhance student teachers' teaching self-efficacy.

Keywords: Authentic assessment, Micro-teaching, Peer-assessment, Pre-service teachers, Teacher education, Teaching self-efficacy

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1. Introduction

Teacher quality is widely recognized as a fundamental determinant of student learning outcomes, with teaching self-efficacy (TSE) identified as a critical factor influencing teachers' instructional effectiveness. Strong efficacy beliefs are associated with effective classroom management, student engagement, instructional innovation, resilience, and improved student achievement, whereas low efficacy is linked with stress, reduced effectiveness, and professional attrition (Tschannen-Moran & Woolfolk Hoy, 2001; Zee & Koomen, 2016; Lee & Davis, 2023). Consequently, strengthening TSE has become a central concern of teacher education programs, particularly in developing contexts such as Ethiopia, where efforts continue to bridge the gap between theoretical preparation and practical teaching competence (Pendergast et al., 2011; Dixon et al., 2024).

TSE develops significantly during initial teacher preparation and becomes increasingly established through professional experience (Hoy & Spero, 2005; Winters, 2012; Yough, 2019). Grounded in Bandura's (1997) social cognitive theory, self-efficacy is shaped by mastery experiences, vicarious learning, verbal persuasion, and emotional states, with mastery experiences considered the most influential source. Therefore, opportunities to practice teaching, observe effective models, receive constructive feedback, and engage in reflective activities are essential for developing strong efficacy beliefs (Pendergast et al., 2011; Donkohi, 2023; Hoca & Tavit, 2024). Conceptually, TSE involves teachers' beliefs in their ability to employ instructional strategies, manage classrooms, and engage students effectively (Tschannen-Moran & Woolfolk Hoy, 2001), all of which are central to professional competence, persistence, and retention (Yilmaz & Turan, 2020).

Teacher preparation programs play a significant role in shaping pre-service teachers' (PSTs) professional confidence by integrating theoretical knowledge with meaningful practical experiences. Activities such as inquiry-based learning, lesson planning, field experiences, classroom assessment, and supervised teaching practice provide opportunities for PSTs to develop perceived competence and professional readiness (Gunning & Mensah, 2011; Hancock & Gallard, 2004; Palmer, 2006; Leonard et al., 2011; Menon & Azam, 2021; Rots et al., 2014). Given that self-efficacy influences PSTs' motivation to enter teaching and their persistence during early career stages (Klassen & Chiu, 2011), strengthening TSE has

become a key objective of teacher education (Efrat & Erez, 2015; Demirbulak et al., 2022; Hoca & Tavil, 2024).

Parallel to developments in teacher education, assessment practices have shifted from traditional summative approaches toward formative and performance-oriented approaches emphasizing real-world application (Birenbaum, 2016). Authentic assessment (AA) represents this shift by engaging learners in meaningful tasks that resemble professional practice, including lesson planning, teaching demonstrations, reflection, and problem-solving (Wiggins, 1993; Gulikers et al., 2004; Ashford-Rowe et al., 2014). When embedded within coursework, AA creates opportunities for mastery experiences, feedback, and reflection, which directly correspond with the mechanisms through which self-efficacy develops (Bloxham, 2008; Shavelson et al., 2008; Villarroel et al., 2021).

Existing research indicates that AA contributes to professional competence, higher-order thinking, collaboration, motivation, and reflective practice (Wu et al., 2015; Sewagegn & Diale, 2020; Villarroel, 2024). Evidence from related assessment approaches, including formative assessment, digital portfolios, self-assessment, and performance-based learning, also suggests positive influences on teacher confidence and efficacy development (Hartley, 2016; Cimermanova, 2015; Baleghizade & Masoun, 2013; Liu, 2021; Demirbulak et al., 2022). Specific authentic practices such as peer-assessment, school practicum, micro-teaching, reflective practice, and constructive feedback have similarly been associated with improved self-efficacy among pre-service teachers (Ahmed, 2015; Lee & Evans, 2019; Theelen et al., 2020; Faith, 2021; Pndee et al., 2020; Lazarides & Warner, 2020; Lopez-Crespo, 2022; Hoca & Tavil, 2024). However, findings are not entirely consistent, as some studies have reported limited or non-significant effects of alternative assessment approaches on self-efficacy (Aliasin & Amanlu, 2017), suggesting the need for further investigation of context-specific interventions.

Among teacher education experiences, practical teaching opportunities appear particularly influential in shaping efficacy beliefs. Extended practicum placements and field-based experiences have been shown to enhance PSTs' confidence in instructional practices, classroom management, and professional collaboration (Colson et al., 2017; Charles et al., 2023; Fairbrother et al., 2025). Similarly, micro-teaching provides a supportive environment for practicing instructional skills, receiving feedback, and refining teaching performance before entering real classrooms (Faith, 2021; Pndee et al., 2020). Peer-assessment further

promotes collaborative reflection, professional dialogue, and self-awareness, enabling PSTs to evaluate teaching practices and develop greater confidence in their abilities (Ahmed, 2015; Lee & Evans, 2019; Abo et al., 2025).

Despite growing evidence supporting AA as a means of enhancing professional learning, empirical research examining its direct influence on TSE remains limited, particularly in African teacher education contexts where theory–practice gaps continue to challenge teacher preparation. This limitation is especially relevant in Ethiopia, where teacher education reforms emphasize competency-based preparation and active learner participation through authentic learning and assessment experiences (Ethiopian Curriculum Framework for Teacher Education, 2022). Although TSE has been widely associated with instructional quality, teacher motivation, resilience, and student outcomes (Bandura, 1997; Schunk & Pajares, 2009; Evers et al., 2012; Ross & Gray, 2006), less is known about how specific course-embedded assessment interventions contribute to its development.

Therefore, this study investigates the effect of selected authentic assessment strategies teaching practice, micro-teaching, and peer-assessment on science pre-service teachers' teaching self-efficacy. By examining AA as a practice-oriented approach to teacher preparation, the study contributes empirical evidence on how assessment can function not only as a means of evaluating learning but also as a mechanism for developing confident, competent, and reflective future teachers.

1.1. Context of the Study

Teacher education programs play a critical role in preparing future teachers to respond to evolving educational demands, particularly the shift from assessment as a grading mechanism toward a continuous process that supports, monitors, and communicates learning (Bailey & Garner, 2010). Within this changing landscape, teacher education institutions are expected to develop student teachers' understanding and application of innovative assessment approaches, including authentic assessment (AA), which emphasizes meaningful tasks aligned with real-world professional practices (De Luca & Klinger, 2010; Volante & Fazio, 2007; De Luca et al., 2013; Gulikers et al., 2008; Huyen, 2017).

Although AA has gained increasing international recognition, empirical evidence regarding its implementation and outcomes in Ethiopia remains limited. Existing studies have examined related aspects of alternative assessment practices (e.g., Sewagegn & Diale, 2020; Shambebe,

2022), but systematic evidence on how course-embedded AA influences pre-service teachers' professional development is still scarce. Therefore, the present study investigates the influence of selected AA strategies on science pre-service teachers' teaching self-efficacy within a teacher education college in Southern Ethiopia.

Teacher education in Ethiopia has undergone substantial transformation in response to changing educational priorities. Beginning with early institutional developments such as Menelik II School (1908) and the establishment of the Faculty of Education at Addis Ababa University (1961), teacher preparation expanded significantly during the 1990s due to increasing demand for qualified teachers (Tekeste, 1990; Tessema, 2010; Semela, 2014). Subsequent reforms under different political periods introduced changes in institutional structures, curricula, and pedagogical orientations (Tirusew, 2006). Major initiatives, including the Teacher Development Program (1997), Teacher Education System Overhaul (2002), and the Curriculum Framework for Teacher Education (CFTE, 2022), reflect continued national efforts to improve teacher quality by emphasizing competency, reflection, and practice-oriented preparation (Gebretsadik *et al.*, 2023).

Within Ethiopia's current education structure, teacher preparation is organized according to school levels and administrative responsibilities. Secondary teacher education (Grades 9–12) is mainly provided through selected public universities under the federal Ministry of Education, whereas pre-primary and primary teacher preparation (KG–Grade 8) is administered through regional teacher education colleges offering diploma and undergraduate programs (MoE, 2022; Abie, 2019). The present study is situated within this latter context, focusing on undergraduate science pre-service teachers enrolled in a teacher education college in Southern Ethiopia.

Recent policy reforms, particularly the CFTE (2022), emphasize authentic and continuous assessment as essential components of effective teacher preparation. The framework promotes learner-centered approaches that develop self-regulated learning, critical thinking, collaboration, creativity, and problem-solving skills. Accordingly, it encourages the use of AA strategies, including portfolios, project-based tasks, micro-teaching, and peer-assessment, to evaluate both learning processes and outcomes (CFTE, 2022). These directions align with the principles of constructive alignment, which emphasize coherence among learning outcomes, instructional practices, and assessment methods (Biggs, 1996; Boud, 1990), as

well as global movements toward more authentic and context-sensitive assessment practices (Birenbaum, 2016; Baartman et al., 2013).

Despite these policy commitments, the practical contribution of AA to developing pre-service teachers' professional confidence remains underexplored in the Ethiopian context. Since authentic assessment provides opportunities for mastery experiences, observation of competent performance, constructive feedback, and reflection, it may serve as an important mechanism for strengthening teaching self-efficacy. Therefore, examining the effects of selected course-embedded AA strategies teaching practice, micro-teaching, and peer-assessment on science pre-service teachers' teaching self-efficacy is timely and significant. The findings may provide evidence-based insights for teacher educators, curriculum designers, and policymakers seeking to strengthen teacher preparation and improve educational quality in Ethiopia and similar contexts.

Building on Bandura's (1997) Social Cognitive Theory, Tschannen-Moran and Hoy's (2001) teacher efficacy framework, and constructivist view this study aimed to investigate how some selected course-embedded authentic assessment influences the teaching self-efficacy of General Science student teachers at Arba Minch College of Education in South Ethiopia. Specifically, the study addressed the following research questions:

1. What are the student teachers' self-efficacy levels in teaching before and after participation in selected course-embedded AA tasks intervention?
2. Is there a significant difference between students in the experimental group and students in the control group in terms of teaching self-efficacy after the intervention?

2. Conceptual Framework

2.1. Assessment in Education

Assessment is an essential component of the teaching-learning process that influences instructional decisions, learning quality, and student achievement (Shepard, 2000). Contemporary perspectives view assessment not merely as a tool for measuring learning outcomes but as an integrated process that supports, monitors, and enhances learning through meaningful feedback and reflection (Sewagegn, 2016; Sewagegn & Diale, 2020). Accordingly, assessment has evolved from traditional summative practices toward approaches that promote competence development, creativity, problem-solving, and learner autonomy.

Assessment is commonly conceptualized as assessment of, for, and as learning (Earl, 2003). While assessment of learning emphasizes summative judgment, assessment for learning uses feedback to improve learning processes (Black & Wiliam, 1998), and assessment as learning positions learners as active participants through self- and peer-assessment. These perspectives highlight that assessment practices influence learners' engagement, learning behaviors, reflection, and self-regulation (Gibbs & Simpson, 2004). However, effective assessment depends on teachers' assessment literacy and their ability to employ contextually appropriate approaches (Matters, 2006). This shift has contributed to the emergence of authentic assessment (AA) as an approach that connects assessment with meaningful professional practice.

2.2. Authentic Assessment: Concept and Educational Significance

Authentic assessment represents a shift from decontextualized testing toward assessment approaches that evaluate learners' ability to apply knowledge and skills in realistic contexts (Wiggins, 1990; Dann, 2014). It involves complex, meaningful tasks requiring learners to integrate knowledge, skills, judgment, and reflection to address real-world problems (Gulikers et al., 2004; Villarroel, 2018; Hu & Liu, 2023). By emphasizing application rather than recall, AA promotes higher-order thinking, problem-solving, metacognition, and professional readiness (Martinez et al., 2018; Koh, 2017; Winther et al., 2022).

AA includes diverse practices such as performance tasks, projects, portfolios, reflective activities, self-assessment, peer-assessment, and simulated professional activities (Frey et al., 2012; Hu & Liu, 2023). When embedded within teacher education, these approaches provide opportunities for learners to engage in authentic professional tasks, receive feedback, reflect on performance, and improve practice. Such features support constructive alignment among learning outcomes, teaching activities, and assessment processes (Biggs, 1996; Villarroel et al., 2019). Consequently, AA is particularly relevant in teacher preparation because it bridges the gap between theoretical knowledge and classroom practice by allowing pre-service teachers to develop practical competence through meaningful experiences (Newmann et al., 1998; Sewagegn & Diale, 2020; Villarroel et al., 2024).

2.3. Teaching Self-Efficacy

Teaching self-efficacy (TSE) refers to teachers' beliefs about their capability to plan, organize, and successfully implement instructional activities within specific teaching contexts (Bandura, 1986, 1997; Tschannen-Moran & Woolfolk Hoy, 2001). Grounded in Bandura's

social cognitive theory, self-efficacy influences individuals' choices, effort, persistence, emotional responses, and performance, particularly when facing challenging tasks (Bandura, 1997). In educational settings, higher TSE is associated with stronger instructional commitment, effective classroom practices, student motivation, engagement, and achievement (Chang, 2015; Katz & Stupel, 2016; Muhonen et al., 2021; Marschall, 2023).

For pre-service teachers, developing TSE is particularly important because efficacy beliefs formed during teacher preparation influence future teaching behaviors, professional confidence, and persistence in the profession. Opportunities to practice teaching, observe effective models, receive constructive feedback, and reflect on performance provide essential experiences through which efficacy beliefs develop (Bandura, 1997; Donkohi, 2023). Therefore, teacher education programs that integrate authentic professional experiences are expected to strengthen pre-service teachers' confidence and readiness for classroom practice.

2.4. Dimensions of Teaching Self-Efficacy

The Teachers' Sense of Efficacy Scale (TSES) conceptualizes TSE as a multidimensional construct consisting of instructional strategies, classroom management, and student engagement (Tschannen-Moran & Hoy, 2001). Instructional strategy efficacy reflects teachers' confidence in selecting appropriate teaching methods, designing effective lessons, and using assessment practices effectively. Classroom management efficacy represents beliefs about maintaining supportive learning environments, managing student behavior, and addressing classroom challenges. Student engagement efficacy refers to teachers' confidence in motivating learners, encouraging participation, and supporting diverse learning needs.

These dimensions collectively represent the complexity of effective teaching and are associated with teacher effectiveness, professional commitment, and student learning outcomes. Teachers with stronger efficacy in instructional strategies are more likely to adopt innovative approaches and demonstrate pedagogical flexibility (Gorozidis & Papaioannou, 2011; Chacón, 2005). Similarly, classroom management efficacy contributes to supportive learning environments and proactive behavior management practices (Abu-Tineh et al., 2011; Lazarides et al., 2020), while student engagement efficacy supports learner motivation and participation (Hettinger et al., 2022; Papa, 2015).

In the present study, authentic assessment strategies teaching practice, micro-teaching, and peer-assessment are conceptualized as mechanisms that enhance overall TSE by providing

mastery experiences, observational learning, feedback, and reflective opportunities. Teaching practice exposes pre-service teachers to authentic classroom contexts, micro-teaching provides structured opportunities for repeated practice and improvement, and peer-assessment promotes collaborative reflection and constructive feedback. Through these interconnected experiences, AA is expected to strengthen pre-service teachers' confidence in their ability to perform essential teaching tasks, thereby improving overall teaching self-efficacy.

2.5. Sources of Teaching Self-Efficacy and Authentic Assessment

Teaching self-efficacy (TSE) develops through individuals' interpretations of efficacy-related information rather than experience alone. According to Bandura's (1986, 1997) social cognitive theory, TSE is shaped by four interacting sources: mastery experiences, vicarious experiences, social persuasion, and physiological or affective states. Among these, mastery experiences are considered the most influential because successful performance provides direct evidence of personal competence, whereas unsuccessful experiences may weaken efficacy beliefs depending on how they are interpreted (Bandura, 1997; Mok et al., 2023). Vicarious experiences develop through observing similar others successfully perform tasks and are particularly influential for individuals with limited experience. Social persuasion, including encouragement, guidance, and constructive feedback from trusted sources, strengthens beliefs about capability, while physiological and emotional states influence self-efficacy through individuals' interpretation of anxiety, confidence, or satisfaction associated with performance (Bandura, 1986; Tschannen-Moran & McMaster, 2009).

Although each source contributes to TSE development, evidence suggests that their combined influence is stronger than the effect of any single source (Bach, 2022; Täschner et al., 2024). The relative contribution of these sources may also vary according to experience level; for example, vicarious experiences are especially important for beginners, whereas direct mastery experiences become increasingly influential as professional experience develops (Bandura, 1997; Täschner et al., 2024). Formative assessment practices, including self- and peer-assessment, have also been shown to enhance self-efficacy by promoting reflection, self-awareness, and recognition of personal growth (Baleghizadeh & Masoun, 2014; Abo et al., 2025).

In teacher education, these sources can be intentionally developed through practice-oriented learning experiences. For pre-service science teachers, opportunities to practice instructional

strategies, reflect on teaching performance, observe competent models, and receive specific feedback are essential for building confidence and professional competence (Bray-Clark & Bates, 2003; Velthuis et al., 2014; Donkahi, 2023). Mastery experiences emerge when student teachers successfully plan and deliver lessons, vicarious experiences develop through observing mentors and peers, social persuasion is strengthened through constructive feedback and encouragement, and positive emotional experiences are fostered as teaching-related anxiety decreases through guided practice (Bandura, 1997; Margolis & McCabe, 2006).

Authentic assessment (AA) provides a suitable framework for creating these efficacy-enhancing experiences because it requires learners to engage in meaningful professional tasks rather than reproduce decontextualized knowledge. In teacher preparation, AA activities such as teaching practice, micro-teaching, peer-assessment, reflective tasks, and performance-based assignments provide opportunities for pre-service teachers to experience authentic teaching responsibilities, receive feedback, and refine their practice. Teaching practice strengthens mastery experiences by allowing student teachers to apply pedagogical knowledge in real classroom contexts (Bautista-Uludag, 2011; Iaochite & Filho, 2016). Micro-teaching supports repeated practice, observation, reflection, and improvement within a supportive environment, thereby enhancing both mastery and vicarious experiences (Tschannen-Moran & McMaster, 2009; Faith, 2021; Pndee et al., 2020). Peer-assessment promotes collaborative learning, professional dialogue, and constructive feedback, strengthening social persuasion and reflective awareness (Ahmed, 2015; Lee & Evans, 2019; Abo et al., 2025).

Empirical evidence indicates that AA-related practices contribute positively to pre-service teachers' self-efficacy development. Authentic learning experiences, reflective practice, field experiences, portfolios, self-assessment, and peer-assessment have been associated with increased confidence, professional competence, and reflective capacity among teacher candidates (Theelen et al., 2020; Lazarides & Warner, 2020; Lopez-Crespo, 2022; Hoca & Tavil, 2024). Similarly, studies demonstrate that feedback-rich assessment environments enhance self-efficacy by helping learners identify strengths, address weaknesses, and develop greater confidence in their capabilities (Demirbulak et al., 2022; Hoca & Tavil, 2024). Although some studies have reported limited effects of alternative assessment approaches (Aliasin & Amanlu, 2017), the overall evidence supports AA as a promising approach for strengthening teacher confidence.

Based on this theoretical and empirical foundation, the present study conceptualizes teaching practice, micro-teaching, and peer-assessment as mechanisms through which authentic assessment enhances overall teaching self-efficacy. These strategies collectively provide mastery experiences, vicarious learning opportunities, constructive feedback, and positive emotional engagement, which are expected to strengthen pre-service teachers' beliefs in their ability to perform teaching tasks effectively. Accordingly, the study investigates whether participation in these course-embedded AA strategies leads to improved teaching self-efficacy among science pre-service teachers.

3. Theoretical Framework

This study is grounded in Bandura's Social Cognitive Theory (SCT), which explains human functioning through the dynamic interaction among personal factors, behavior, and environmental influences, known as triadic reciprocal determinism (Bandura, 1986, 2001). A central construct within SCT is self-efficacy, defined as individuals' beliefs about their capability to organize and execute actions required to achieve desired outcomes (Bandura, 1997). These beliefs influence task selection, effort, persistence, interpretation of challenges, and adaptation to demanding situations (Pajares, 1996; Pajares, 2002).

From an SCT perspective, teaching self-efficacy is not a fixed attribute but a dynamic belief system that develops through experience, reflection, and interaction with the learning environment. Bandura (1997) identified four primary sources of self-efficacy: mastery experiences, vicarious experiences, social persuasion, and physiological or affective states. Mastery experiences are considered the strongest source because successful performance provides direct evidence of competence. Vicarious experiences develop through observing others' successful performances, social persuasion emerges through feedback and encouragement from significant others, and physiological or emotional states influence how individuals interpret their readiness and capability to perform tasks.

In teacher education, these mechanisms are particularly relevant because pre-service teachers (PSTs) construct their professional confidence through opportunities to practice teaching, observe competent models, receive feedback, and reflect on their performance. Authentic assessment (AA) aligns closely with these processes by engaging PSTs in meaningful, practice-based tasks that resemble real teaching situations. Through activities such as teaching practice, micro-teaching, and peer-assessment, AA creates opportunities for

successful performance, collaborative learning, constructive feedback, and emotional adaptation to teaching demands (Donkohi, 2023; Hoca & Tivil, 2024).

Teaching practice provides mastery experiences by allowing PSTs to apply pedagogical knowledge in authentic classroom contexts. Micro-teaching supports repeated practice, observation, reflection, and improvement within a supportive environment, strengthening both mastery and vicarious experiences. Peer-assessment promotes dialogue, feedback, and professional reflection, contributing to social persuasion and self-regulated learning. These processes are consistent with evidence that observation, feedback, and reflective engagement contribute to the development of teacher confidence (Martins et al., 2015; Palmer, 2011; Tatar & Bulgur, 2013).

The framework is further informed by constructivist perspectives, which view learning and professional knowledge as actively constructed through meaningful experiences and social interaction. From this perspective, embedding AA within teacher education enables PSTs to develop competence through authentic participation, reflection, collaboration, and feedback. Thus, AA serves not only as an assessment approach but also as a learning mechanism that supports the development of professional beliefs and teaching competence.

Accordingly, this study conceptualizes course-embedded AA as an intervention mechanism that activates the sources of self-efficacy through realistic teaching experiences, peer and instructor feedback, and guided reflection. It is hypothesized that participation in teaching practice, micro-teaching, and peer-assessment will strengthen PSTs' overall teaching self-efficacy. Among the four sources of efficacy, mastery experiences are expected to play the most influential role because repeated successful engagement in authentic teaching tasks provides the strongest evidence of professional capability (Bandura, 1997).

4. Methods and Materials

4.1. Setting study participants

The research was conducted at Arba Minch College of Education situated in the southern Ethiopia regional state, approximately 505 km south of Addis Ababa, the capital city. The college offers certificate, diploma, and bachelor's degree programs across pre-primary, primary, middle, and secondary education levels. At the time of the study, the college enrolled 395 degree-level students, 920 diploma-level trainees, and 56 certificate-level participants. The study specifically involved purposefully selected 60 second-year General

Science student teachers (36 males and 24 females) through convenience sampling. Being trained in two intact groups, they are enrolled in a four-year program comprising 57 courses totaling 144 credit hours, including pedagogical courses, content knowledge, practicum experiences, and research methods. And, Arba Minch College of Education was chosen as a study site due to its convenience and manageability to the researchers.

Informed consent was obtained from all participants, recognizing its central role in ensuring ethical research practice and enabling individuals to make informed decisions about their participation. Accordingly, the researchers secured formal permission from the college and department of general science before data collection. Participants were provided with clear explanations regarding the study's objectives, procedures, and anticipated benefits to ensure adequate understanding of the research process. In addition, they were informed of their rights as participants, assured of the confidentiality of their responses, and protected through strict adherence to institutional ethical guidelines. These measures helped safeguard participants' rights while enhancing the credibility, validity, and reliability of the study.

The intervention was embedded within the "General Methods of Teaching" (GMT) course, a second-year, three-credit-hour course designed to equip student teachers with practical pedagogical skills aligned with Ethiopia's Curriculum Framework for Teacher Education (CFTE, 2022). The GMT course emphasizes the integration of theoretical knowledge with classroom practice. The intervention aimed to enhance teaching self-efficacy in the domains of instructional strategies, classroom management, and student engagement through course-embedded authentic assessment tasks, guided by both CFTE principles and prior research demonstrating the importance of practical, feedback-driven learning experiences (Flores, 2015; El-Ahwal, 2020; Tschannen-Moran & Woolfolk Hoy, 2001).

4.2. Design of the study

This study adopted a quasi-experimental pretest–posttest control group design to examine the effect of course-embedded authentic assessment on student teachers' teaching self-efficacy. Although the design does not involve randomization, it is widely employed in educational research where randomization is impractical, offering a feasible means of capturing changes in participants' outcomes over time (Leflore, 2012; Issel, 2013; Marlow, 2010; Thyer, 2002). Its utility in evaluating educational interventions has been well documented across diverse contexts (Siu et al., 2014; Gao et al., 2016; Case-Smith et al., 2012; Koller & Stuart, 2016;

Hofmann & Astleitner, 2020; Lee & Davis, 2023). Consistent with recommendations by Mujis (2004), Creswell (2012), and Cohen et al. (2018), the design enabled the assessment of intervention effectiveness while accounting for practical constraints. In this study, course-embedded authentic assessment is served as the independent variable, and teaching self-efficacy as the dependent variable.

4.3. The instruments

Teaching self-efficacy of student teachers before and after interventions was measured using the *Ohio State Teachers' Sense of Efficacy Scale* (short form), a validated 12-item instrument assessing efficacy in student engagement, instructional strategies, and classroom management. The purpose of the questionnaire was to identify if there were significant differences in TSE levels as a result of the intervention. Data collection occurred during the second semester of the 2025/26 academic year, both prior to and following the intervention. The trainee teachers were guided to assess their confidence levels pertaining to their current capabilities in performing the teaching tasks outlined in the questionnaire. Thus, it was utilized to assess perceived levels of self-efficacy among student teachers (Tschannen-Moran & Woolfolk Hoy, 2001). This scale, comprising 12 items, is evaluated along a 9-point continuum, with anchors ranging from 1 ("Nothing") to 9 ("A Great Deal"). It encompasses three subsections: efficacy in student engagement (4 items), instructional strategies (4 items), and classroom management (4 items). The reliability of the subscales, as measured by Cronbach's alpha, ranged from .90 to .93 (Jamil, Downer, & Pianta, 2012). The instrument's reliability in this study was Cronbach's $\alpha = .73$. The pre- and post-intervention surveys were administered in classroom settings using paper-pencil format.

4.4. Procedures

4.4.1. Intervention Procedure

The intervention was embedded within the three-credit *General Methods of Teaching* (GMT) course offered to second-year science pre-service teachers in accordance with the Ethiopian Curriculum Framework for Teacher Education, which emphasizes competency-based and practice-oriented teacher preparation (CFTE, 2022). The intervention aimed to enhance teaching self-efficacy through the systematic integration of three authentic assessment (AA) strategies: field teaching practice, micro-teaching, and peer-assessment. The design was guided by Gulikers et al.'s (2004) authentic assessment framework, ensuring alignment among task authenticity, physical context, social context, assessment form, and performance

criteria. The intervention was implemented in three stages: pre-intervention preparation, six-week intervention, and post-intervention evaluation.

During the pre-intervention stage, institutional permission was obtained from participating primary schools, and mentor teachers were oriented regarding the objectives, supervision procedures, and their roles in supporting trainee teachers. Participants from the two intact groups completed the pre-test using the short form of the Ohio State Teachers' Sense of Efficacy Scale. Subsequently, the pre-questionnaire data collected from each participant were coded and analyzed using SPSS software version 26.0. The results indicated that there were no significant difference between the two intact groups concerning their teaching self-efficacy ($t(58) = .065$, $p = .946 > 0.05$), suggesting that the two groups were comparable. Student teachers in experimental groups received a four-day refresher training focused on lesson planning, instructional methods, classroom management, teaching delivery, and peer-assessment procedures. Particular emphasis was placed on preparing participants to engage effectively in authentic assessment activities through structured rubrics, collaborative learning, and reflective practice. Participants in intervention groups were organized into six mixed-ability groups of five members based on their previous academic performance to facilitate peer learning and cooperation.

The six-week intervention consisted of field teaching practice followed by micro-teaching integrated with peer-assessment. During the first four weeks, participants conducted teaching practice in six selected primary schools within Grade 7 general science classrooms. In the first week, trainees observed mentor teachers' instructional practices, including lesson preparation, classroom management, and student engagement strategies, using structured observation guides. During the subsequent three weeks, trainees independently delivered lessons, with mentor teachers and researchers providing continuous supervision, observation, and feedback to support instructional improvement.

The final two weeks focused on micro-teaching and peer-assessment conducted in the college setting. Micro-teaching was implemented as a structured cycle of collaborative lesson planning, individual teaching presentations, peer and instructor observation, assessment, feedback, and reflection. This approach provided a controlled environment where pre-service teachers could rehearse teaching skills and improve performance through repeated practice (Bakır, 2014; Banerjee et al., 2015). Peer-assessment was conducted using standardized rubrics covering lesson organization, content accuracy, instructional delivery, interaction, and

use of teaching resources. Anonymous peer feedback and instructor comments were provided to promote fairness, reflection, and pedagogical improvement.

Following the intervention, participants completed the post-test version of the Ohio State Teachers' Sense of Efficacy Scale. In addition, semi-structured interviews were conducted with three randomly selected participants to explore their experiences with the authentic assessment activities and their perceived influence on teaching self-efficacy. Interviews were conducted in English or Amharic based on participant preference, recorded, transcribed, translated where necessary, and analyzed thematically.

4.4.2. Procedures to Enhance Internal and External Validity

Although quasi-experimental designs may face threats to internal validity due to the absence of random assignment, careful planning and systematic implementation can strengthen methodological rigor (Leavy, 2017; Vanderstoep & Johnston, 2009). In this study, baseline teaching self-efficacy was measured before the intervention to establish group comparability, and demographic and educational characteristics of participants were examined to reduce potential selection bias.

Consistency of implementation was maintained through standardized training procedures, assessment rubrics, observation checklists, supervision guidelines, and feedback mechanisms across all intervention activities. Continuous monitoring was conducted to minimize procedural variations and potential confounding influences. The use of authentic school and classroom contexts also enhanced ecological validity by allowing the intervention to occur within realistic teacher preparation environments.

The quasi-experimental design was considered appropriate because teacher education contexts often involve naturally formed groups, making random assignment difficult (Mohamed, Olamo, & Yemiru, 2025). Therefore, the design provided a practical and contextually relevant approach for examining the influence of authentic assessment strategies on pre-service teachers' teaching self-efficacy while maintaining methodological rigor through systematic control procedures (Vanderstoep & Johnston, 2009).

4.5. Data analysis

The quantitative data were analyzed using descriptive statistics and inferential statistics. Concerning the statistical assumptions, Levene's test for the equality of variances yielded a

result ($p = 0.990 > 0.05$), indicating homogeneity of variances, while the Shapiro-Wilk test for normality revealed no statistically significant deviations for the experimental group ($p = 0.085 > 0.05$) and that of the control group ($p = 0.959 > 0.05$). In terms of descriptive statistics, mean and standard deviations were computed for the writing self-efficacy scores to enable a comparative analysis of these scores. Concerning inferential statistics, the independent sample t-test was applied to confirm the homogeneity of participants across both the experimental and control groups prior to the intervention whereas the paired sample t-test was executed to measure the difference in the mean scores of the experimental and control groups from the pre-test to the post-test. Moreover, a one-way ANCOVA was conducted to investigate the effects of selected authentic assessment strategies on pre-service science student teachers' teaching self-efficacy. The data obtained from the face to face semi-structured interviews were also transcribed and analyzed thematically emphasizing on the three dimensions TSE.

Quantitative and qualitative data were collected and analyzed sequentially, then integrated through a narrative weaving approach presented in the discussion section. Quantitative results were reported first, followed by corresponding qualitative evidence to explain and contextualize statistically significant findings. The qualitative data offered deeper interpretive insights by revealing underlying personal factors, institutional cultures, and pedagogical traditions shaping participants' responses. This systematic integration of numerical trends with narrative accounts enabled a more comprehensive and nuanced understanding of the phenomenon, thereby strengthening the interpretive validity and overall robustness of the study

Ethical considerations were addressed by obtaining approval from Hawassa University's Research Ethics Committee with the approval reference number COE-RCC/023/25. Participants provided informed consent and were assured of confidentiality, voluntary participation, and the right to withdraw at any time. Detailed information regarding the study's objectives, procedures, and potential benefits was provided to all participants prior to their engagement in the research.

5. Results

5.1. Quantitative results

Before analyzing the overall self-efficacy and its dimensions; efficacy in instructional strategies, student engagement, and classroom management, before and after the intervention,

the Shapiro Wilk test was employed to assess data normality. The results demonstrated that teaching self-efficacy of control groups ($W(30) = 0.939$, $p = 0.085$) and experimental groups ($W(30) = 0.959$, $p = 0.290$). Consequently, inferential statistical analyses were deemed appropriate for comparing pretest and posttest data.

Table 1. Pre-intervention independent sample t-test results of TSE Scores

Context	Groups	n	M	SD	Df	t-value	p-value
Pre-TSE results	Experimental	30	33.40	7.93	58	.065	.946
	Control Group	30	33.53	7.92			

As illustrated in Table 1, an independent samples t-test was conducted to check the homogeneity of the experimental and the control groups in terms of teaching self-efficacy before the intervention. This test was found to be statistically not significant, $t(58) = .065$, $p = .946 > 0.05$). As the results in Table 1 indicate, the experimental group's writing self-efficacy mean score ($M = 33.40$, $SD = 7.93$) is almost similar with the mean score in the control group ($M = 33.53$, $SD = 7.92$). This demonstrates the participants allocated to the experimental and the control groups are comparable in terms of teaching self-efficacy level prior to implementing the three techniques of authentic assessment.

Table 2. Paired sampled t-test of TSE scores in pre- and post-interventions

Groups	N	Pre-experiment		Post-experiment		Df	t-value	p-value
		M	SD	M	SD			
EG	30	33.40	7.93	65.86	7.35	29	-14.11	.000
CG	30	33.53	7.92	33.73	7.80	29	-1.79	.083

As demonstrated in Table 2, a paired sample t-test was employed to examine the progress of comparing the pre-test scores with the post-test scores of the experimental group (EG) and the pre-test scores with the post-test scores of the control group (CG). As the results in Table 2 illustrate, significant increase in teaching self-efficacy was found from the pre-test to post-test for the experimental group, $t(29) = -14.11$; $p = .000 < 0.05$), but insignificant increase was observed for the control group, $t(29) = -1.79$, $p = .083 > 0.05$). The table shows that the teaching self-efficacy mean score for the experimental group increased from ($M = 33.40$, $SD = 7.93$) on the pre-test to ($M = 65.86$, $SD = 7.35$) on the post-test. In the same manner, the teaching self-efficacy mean score for the control group increased from ($M = 33.53$, $SD = 7.92$) on the pre-test to ($M = 33.73$, $SD = 7.80$) on the post-test which is not significant.

Table 3. ANCOVA test for comparing experimental and control groups' teaching self-efficacy post mean scores

Tests of Between-Subjects Effects					
Dependent Variable: Post TSE score					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	16183.670 ^a	2	8091.835	174.847	.000
Intercept	4208.182	1	4208.182	90.930	.000
Score	695.404	1	695.404	15.026	.000
Group	14614.229	1	14614.229	315.782	.000
Error	2637.930	57	46.279		
Total	167624.000	60			
Corrected Total	18821.600	59			

a. R Squared = .860 (Adjusted R Squared = .855)

As can be seen from Table 3, a one-way ANCOVA was conducted on the writing self-efficacy scores, utilizing the pre-experimental participants' teaching self-efficacy score as a covariate. The results from the ANCOVA analysis demonstrated that there was statistically significant difference between the experimental and the control groups, $F(1, 57) = 315.782$, $p = .000$). These findings imply that the implemented authentic assessment strategies enhanced experimental group participants' teaching self-efficacy.

5.2. Qualitative findings

Overall Teaching Self-Efficacy

Post-intervention interviews conducted with six participants provided rich insights into how course-embedded authentic assessment contributed to the development of teaching self-efficacy among pre-service science teachers. Thematic analysis revealed notable improvements across the three core dimensions of teaching efficacy: instructional strategies, student engagement, and classroom management. Participants consistently attributed these gains to authentic learning experiences of micro-teaching and field-based practice.

One participant explained how exposure to real classroom practices and structured feedback enhanced confidence in instructional delivery:

"The field experience in this course allowed me to observe a mentor's lesson planning and delivery in a real teaching context, which clarified expectations for my future career. Feedback from my instructor and peers after micro-teaching boosted my confidence and sense of adequacy in lesson delivery."

These activities significantly enhanced my teaching efficacy.” (Participant 1, post-intervention)

Similarly, another participant described how authentic experiences strengthened confidence in engaging learners:

“Before participating in the course, I had a limited understanding of motivating students. Observing my mentor and receiving constructive feedback during micro teaching significantly boosted my confidence to engage students. Now, I feel relatively confident in facilitating student engagement in learning activities.” (Participant 3, post-intervention)

Concerns regarding classroom control also appeared to diminish through practical engagement and guided support. As one participant reflected:

“Managing misbehavior worried me when I first considered the teaching profession. Observing my mentor and implementing their advice during the intervention helped me gain confidence in handling classroom management challenges.” (Participant 2, post-intervention)

Efficacy in instructional strategies

Similarly, participants reported marked improvement in their ability to plan, organize, and implement instruction effectively. These improvements were largely associated with experiential activities, including observation of mentor teachers, practice-based micro-teaching sessions, and continuous feedback from peers and instructors. One participant noted:

“The field experience allowed me to observe how a mentor plans and teaches real lessons. After teaching my own micro-lesson and receiving feedback, my confidence in lesson preparation and delivery increased greatly.” (Participant 1, post-intervention)

Such experiences reflect the role of mastery experiences in strengthening self-efficacy beliefs, as emphasized by Albert Bandura (1997). Through repeated practice, reflection, and feedback, participants were able to connect pedagogical theory with authentic classroom application, thereby internalizing effective instructional competencies.

Efficacy in Student Engagement

Interview data further indicated substantial growth in participants' confidence to motivate and actively engage learners. Student teachers reported that authentic assessment tasks encouraged them to employ interactive teaching approaches, reinforcement techniques, and instructional resources more effectively. One participant stated:

"Before this course, I did not know how to make lessons exciting for students. After observing my mentor and practicing with feedback, I learned how to motivate learners and keep them involved." (Participant 3, post-intervention)

This finding illustrates the importance of vicarious learning in efficacy development, whereby observing competent models enhances individuals' beliefs in their own capabilities (Bandura, 1997). The selected AA process created opportunities for guided observation, collaborative practice, and reflective learning, all of which contributed to stronger confidence in facilitating meaningful student participation.

Efficacy in Classroom Management

Among the three dimensions, classroom management emerged as the area showing the greatest perceived improvement. Initially, many participants viewed classroom control and discipline management as intimidating aspects of teaching. However, exposure to real classroom situations and opportunities to practice management techniques during micro-teaching and field-based teaching practice significantly enhanced their confidence. One participant explained:

"I used to worry about controlling students, but during the field-based teaching practice I learned to monitor behavior continuously and apply consistent routines. Now I feel confident to manage a class on my own." (Participant 2, post-intervention)

These accounts highlight the contribution of enactive mastery experiences to the development of classroom management efficacy. By engaging directly with authentic teaching contexts, participants gained practical competence and confidence in maintaining productive learning environments.

Overall, the qualitative findings strongly complemented the quantitative results, demonstrating that course-embedded authentic assessment generated both statistically

significant and educationally meaningful improvements in teaching self-efficacy. The interview narratives provided deeper insight into the specific learning experiences that fostered these gains, particularly through opportunities for practice, feedback, collaboration, reflection, and mentor-supported learning.

These findings suggest that when authentic assessment is systematically integrated into coursework rather than implemented as a supplementary activity, it serves as a transformative pedagogical approach. Such integration enables pre-service teachers to bridge the gap between theoretical preparation and classroom practice, engage in critical reflection, and internalize professional teaching standards. In the context of Ethiopian teacher education, this approach may help address the persistent disconnect between academic preparation and practical classroom readiness highlighted by the Ministry of Education Ethiopia (MOE, 2018).

6. Discussions

The present study examined the extent to which course-embedded authentic assessment enhances pre-service science teachers' overall teaching self-efficacy. The findings demonstrated that integrating authentic assessment tasks within teacher education courses substantially strengthened student teachers' confidence in their teaching capabilities. The consistent improvement observed across all dimensions suggests that engaging pre-service teachers in meaningful, practice-oriented learning experiences enables them to develop stronger beliefs in their ability to perform teaching tasks successfully in real classroom contexts.

Overall Teaching Self-efficacy

The significant improvement in overall teaching self-efficacy among the experimental group, compared with the non-significant change in the control group, suggests that embedding authentic assessment strategies within teacher education can substantially strengthen pre-service teachers' confidence in their teaching capabilities. This finding can be interpreted through Bandura's social cognitive theory, which identifies mastery experiences, vicarious experiences, verbal persuasion, and emotional states as major sources of self-efficacy development (Bandura, 1997). The three authentic assessment strategies implemented in this study: teaching practice, micro-teaching, and peer-assessment provided interconnected opportunities for student teachers to experience these efficacy-enhancing processes. Through

authentic tasks that reflected real teaching responsibilities, participants were able to apply theoretical knowledge, practice instructional skills, receive feedback, and reflect on their performance. Such experiences are central characteristics of authentic assessment, which requires learners to demonstrate knowledge and competence through meaningful tasks resembling real-world professional practice (Gulikers et al., 2004; Mueller, 2005; Dahlback et al., 2020).

Teaching practice contributed to the development of teaching self-efficacy by exposing student teachers to actual classroom environments where they could observe experienced teachers, interact with learners, apply pedagogical knowledge, and receive guidance from mentors. These experiences created powerful mastery and vicarious learning opportunities that helped participants develop confidence in their professional capabilities. Previous studies similarly indicate that authentic field experiences and supervised teaching practice strengthen pre-service teachers' efficacy beliefs by connecting teacher preparation with realistic classroom demands (Yilmaz & Cavas, 2008; Banas & York, 2014; Pfitzner-Eden, 2016; Ma et al., 2021; Taufik et al., 2025). As Bandura (1997) emphasized, successful performance experiences are particularly influential because they provide direct evidence of personal competence.

Similarly, micro-teaching played an important role in enhancing teaching self-efficacy by providing a structured and supportive environment for repeated practices. Through cycles of lesson planning, teaching, observation, feedback, reflection, and improvement, student teachers were able to gradually refine their instructional skills and reduce uncertainty associated with classroom teaching. These repeated practice opportunities functioned as mastery experiences while also allowing participants to observe effective teaching behaviors and learn from peers. Previous research has demonstrated that micro-teaching enhances teacher confidence, pedagogical competence, reflective practice, and classroom readiness by creating opportunities for rehearsal and constructive feedback (Yan & He, 2017; Tulgar, 2019; Danday, 2021; Cerruto et al., 2023; Thenga, 2026).

Peer-assessment further reinforced the development of teaching self-efficacy by engaging student teachers in collaborative evaluation, reflection, and professional dialogue. By assessing peers' teaching performances and receiving feedback on their own practices, participants developed greater awareness of effective teaching approaches, identified areas for improvement, and strengthened their confidence in their ability to teach. The feedback

generated through peer interactions and instructor comments served as an important source of verbal persuasion, enabling participants to recognize progress and develop stronger beliefs in their teaching competence. These findings support previous studies highlighting the contribution of peer-assessment to self-efficacy, reflective thinking, autonomy, and professional growth among pre-service teachers (Ashraf & Mahdinezhad, 2015; Harrison et al., 2015; Bozkurt, 2020; Germain et al., 2022).

The role of continuous formative feedback across all three authentic assessment strategies is particularly noteworthy. Unlike traditional assessment approaches that often emphasize final performance evaluation, the authentic assessment environment provided ongoing feedback that supported improvement throughout the learning process. Through feedback during teaching practice, micro-teaching, and peer-assessment, student teachers were able to identify strengths, address weaknesses, and progressively improve their teaching performance. This finding extends existing evidence that formative feedback contributes not only to academic improvement but also to professional confidence and identity development among future teachers.

Overall, the findings demonstrate that the combined implementation of teaching practice, micro-teaching, and peer-assessment created a comprehensive learning environment that strengthened overall teaching self-efficacy through multiple pathways. These strategies enabled student teachers to engage in authentic professional activities, observe competent teaching, practice instructional behaviors, receive constructive feedback, and reflect on their growth. Consistent with Bandura's (1977, 1986) proposition, the sources of self-efficacy operated interactively within personal, behavioral, and environmental contexts. Therefore, course-embedded authentic assessment represents a valuable approach for teacher education programs seeking to develop confident, competent, and reflective future teachers. The findings provide empirical support for integrating authentic assessment more systematically into teacher preparation curricula, particularly within contexts where opportunities for practice-based teacher development remain limited.

7. Conclusions and implications

This study examined teaching self-efficacy as a context-specific construct reflecting student teachers' beliefs in their capacity to plan instruction, engage learners, and manage classroom environments effectively (Bandura, 1997). The study implemented a six-week intervention

with experimental group participants that integrated teaching experience, micro-teaching, and peer-assessment as course embedded authentic assessment. Drawing on both quantitative and qualitative evidence, the findings indicate that embedding authentic assessment within course content meaningfully enhanced student teachers' overall teaching self-efficacy and its core dimensions. These findings are consistent with previous research emphasizing the role of authentic, practice-based learning experiences in strengthening pre-service teachers' efficacy beliefs (Donkoh, 2023; Marschall, 2023; Rodríguez et al., 2024).

This study provides important practical, theoretical, and policy-related implications for teacher education, particularly within the context of pre-service teacher preparation in Ethiopia. Practically, the findings demonstrate that integrating AA tasks such as teaching practice, micro-teaching, peer assessment, reflective activities, mentoring, and structured feedback within course content can substantially strengthen pre-service science teachers' teaching self-efficacy. The intervention enhanced overall teaching self-efficacy as well as the dimensions of instructional strategies, student engagement, and classroom management. These findings suggest that teacher education institutions should move beyond conventional assessment approaches and intentionally design practice-oriented learning experiences that mirror real classroom responsibilities. Embedding authentic tasks within teacher education courses can better prepare trainee teachers to address the complex realities of classroom teaching with greater confidence, resilience, and professional competence. In addition, strengthening teaching self-efficacy during initial teacher preparation may contribute to improved instructional effectiveness and long-term educational outcomes.

The study also offers significant theoretical contributions by extending Bandura's social cognitive theory into the context of Ethiopian pre-service teacher education. The findings illustrate how course-embedded authentic assessment activates the major sources of self-efficacy; mastery experiences, vicarious experiences, verbal persuasion, and emotional support which collectively enhance trainee teachers' efficacy beliefs. By linking authentic assessment practices with the development of teaching self-efficacy, the study reinforces the argument that assessment can function not only as an evaluative mechanism but also as a pedagogical strategy that promotes professional learning. The findings further support earlier studies emphasizing the positive role of authentic and practice-based learning experiences in strengthening teacher efficacy beliefs (Donkoh, 2023; Marschall, 2023; Rodríguez et al., 2024). Moreover, the results highlight the importance of exposing pre-service teachers to

authentic teaching contexts from the early stages of training to reduce the “reality shock” commonly experienced during entry into the profession (Veenman, 1984).

At the institutional and policy levels, the findings underscore the need for curriculum reforms that prioritize course-embedded authentic assessment within teacher education programs. Teacher education colleges and academic leaders should establish supportive conditions for the consistent implementation of authentic assessment practices through professional development opportunities, curriculum alignment, mentorship systems, and adequate institutional support. The findings are particularly relevant to the Ethiopian teacher education framework, where practicum exposure remains limited for bachelor degree pre-service teachers. Expanding opportunities for continuous and authentic school-based experiences throughout teacher preparation may facilitate gradual professional development through successive approximation to real teaching tasks. Accordingly, policymakers and curriculum developers should revise assessment frameworks and teacher education guidelines to explicitly promote authentic, practice-oriented assessment approaches that foster the development of confident, reflective, and competent teachers capable of responding effectively to contemporary classroom demands.

8. Limitations and direction for future research

This study employed non-equivalent pretest–posttest control group quasi-experimental design without randomization, which limits the ability to attribute observed changes in teaching self-efficacy exclusively to the course embedded authentic assessment intervention. Although this design is widely used in applied educational research where randomization is impractical, potential alternative explanations such as maturation, concurrent coursework, or external experiences cannot be fully ruled out. In addition, the relatively small, purposefully selected sample drawn from a single department within one teacher education institution constrains the generalizability of the findings to other programs, disciplines, or institutional contexts.

In addition, the study relied primarily on self-reported data to measure teaching self-efficacy. While the Ohio State Teacher Sense of Efficacy Scale is a well-validated and widely used instrument, self-report measures may be influenced by social desirability and may not fully reflect actual teaching practices or classroom performance. Moreover, the study focused on changes in student teachers’ self-efficacy beliefs and did not examine whether these changes translated into observable instructional behaviors or improved learning outcomes for school

students. Future research would benefit from incorporating observational measures, performance-based assessments, and student-level outcome data.

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Data Availability Statement

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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Conflicts of interest

The authors declare that there are no conflicts of interest associated with this study.

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