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Primary pre-service teachers' self-efficacy beliefs in integrating gender approaches: relationship with demographic profiles

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This study investigates the self-efficacy beliefs of Moroccan primary pre-
service teachers in implementing gender-sensitive teaching practices. Drawing
on data from 392 trainees across six Regional Centers for Education
and Training Professions, the research used a mixed-methods approach
combining a validated self-efficacy scale with focus group interviews. The
study aimed to assess trainees' confidence levels in gender knowledge,
pedagogical implementation, and attitudes, focusing first on challenges faced
by female trainers in Morocco and how these vary according to demographic
characteristics. Findings reveal that trainees generally express moderate to high
self-efficacy in applying gender-responsive pedagogy and fostering inclusive
attitudes. However, a clear gap persists in their conceptual understanding of
gender issues, indicating a need for stronger theoretical foundations. Female
trainees consistently reported greater confidence in gender pedagogy than
their male counterparts, while educational level, specialization, and year of
training had minimal influence on self-efficacy beliefs. The results underscore
the importance of integrating targeted gender content and practical strategies in
teacher education. Focus group insights further suggest that trainees are eager
to adopt inclusive practices but lack structured training and institutional support.
This research offers timely insights into the current state of gender integration
in Moroccan teacher training. It emphasizes the urgency of curriculum
reforms that promote gender equity and highlights the role of teacher self-
efficacy in driving inclusive educational transformation. Its significance lies in
informing national strategies that aim to equip future Moroccan educators
with the confidence and tools necessary to foster equitable and gender-
responsive classrooms.

Introduction

Education is vital in shaping a sustainable and prosperous future for societies by equipping future generations to tackle emerging challenges. As the world continues to evolve at an unprecedented pace, the education system must undergo transformative reforms to align with current needs and societal aspirations. In Morocco, this belief has shaped an ambitious series of reforms aimed at making schools more inclusive, just, and more relevant to 21st-century realities. The Strategic Vision 2015–2030 "For a School of Equity, Quality, and Advancement," published by the Higher Council for Education, Training and Scientific Research (CSEFRS), lays the foundation for this transformation (Higher Council for Education, Training and Scientific Research [CSEFRS], 2015). Through Framework Law 51.17, Morocco is committed to improving learning conditions, reducing inequalities, and rethinking how teachers are trained (Bourqia, 2016; Kingdom of Morocco [KM], 2019).

This educational reform is intrinsically linked to Morocco's broader commitment to sustainable development, as enshrined in its 2011 Constitution. The constitutional framework provides a strong legal basis for inclusive and equitable progress, with specific articles emphasizing social justice, equal rights, and gender equality, particularly through Articles 31, 35, 136, and 152 (Constitution du Royaume du Maroc [CKM], 2011). Additionally, Article 19 establishes a strong foundation for a more equitable and inclusive society by promoting gender equality and enshrining equal rights in various aspects of life (Constitution du Royaume du Maroc [CKM], 2011). Building on this foundation, Morocco launched the National Sustainable Development Strategy [NSDS] 2030 in 2016, aiming to operationalize its development goals through coherent and actionable policies (Benslimane, 2022). The strategies and objectives outlined in Issue 6 of the NSDS demonstrate a comprehensive commitment to promoting inclusion and reducing disparities in access to quality education in Morocco (Royaume du Maroc [KM], 2017; Benslimane, 2022). Recognizing education as a critical driver of sustainable development, the NSDS prioritizes access to quality, inclusive, and equitable education to foster the awareness, empowerment, and innovation needed to address the complex challenges of the 21st century (Royaume du Maroc [KM], 2017), aligning with international priorities (UNESCO, 2019). In Morocco, efforts to integrate a gender approach across various sectors have been supported by national programs and international partnerships (Ministère de la Famille, de la Solidarité, de l'Egalité, et du Développement Social [MFSEDS], 2018; UNESCO, 2018; Akerbib et al., 2020;

Millennium Challenge Account [MCA], 2021; Jebli et al., 2021; Sabbar, 2021). However, its implementation in classroom settings remains limited, despite national recommendations by the CSEFRS (UNESCO, 2019).

Teacher training centers, especially Regional Centers for Education and Training Professions (CRMEFs), are at the forefront of this challenge. Future primary school teachers are expected not only to be aware of gender-related issues but also to know how to address them in their classrooms with real students. As agents of change in the teaching-learning environment, beliefs, capabilities, and disposition of teachers to implement new practices play a crucial role in converting policy to practice. According to Bandura (1995), self-efficacy is the belief in one's capability to organize and execute the actions required to achieve specific goals. Teacher self-efficacy is widely recognized as a key determinant of classroom practices and student outcomes (Tschannen-Moran and Hoy, 2001). High levels of self-efficacy empower educators to take pedagogical risks, implement innovative methods, and adapt their teaching to the diverse needs of learners. As such, it catalyzes pedagogical innovation, particularly in promoting equity-oriented approaches like gender-sensitive teaching. Research shows that teachers with greater self-efficacy are more likely to employ learner-centered strategies and integrate inclusive practices that go beyond traditional instructional models (Guskey, 2002). Understanding how teachers meet these expectations requires examining their self-perceptions. Self-efficacy refers to individuals' beliefs in their ability to organize and execute the actions required to manage situations effectively (Bandura, 1995). It emerges from four key sources: mastery experiences, vicarious observation, verbal persuasion, and physiological and emotional states. In educational contexts, self-efficacy influences teachers' capacity for innovation, resilience, and commitment to inclusive practices (Tschannen-Moran and Hoy, 2001; Zee and Koomen, 2016). Regarding gender equality, strong self-efficacy beliefs can significantly affect whether and how future teachers integrate gender perspectives into their work. In teaching, self-efficacy is often categorized into three dimensions: instructional efficacy, classroom management, and student engagement (Gibson and Dembo, 1984; Tschannen-Moran and Hoy, 2001; Klassen et al., 2011; Zee and Koomen, 2016). Strengthening these dimensions is essential for promoting gender-responsive and innovative teaching practices.

Empirical studies consistently highlight the crucial role of teachers' self-efficacy beliefs in shaping their instructional practices and responsiveness to educational reform. Three levels: low, moderate, and high teacher efficacy beliefs can be categorized. Teachers with low self-efficacy beliefs tend to doubt their capacity to influence student learning, especially under difficult teaching conditions (Ashton and Webb, 1986). Teachers with moderate levels of self-efficacy may demonstrate confidence in certain areas but often implement reforms inconsistently, resulting in uneven or fragmented instructional practices (Ross, 1998). In contrast, high-efficacy teachers strongly believe in their ability to influence student learning regardless of external barriers (Bandura, 1997). This confidence is linked to their willingness to embrace curriculum innovations (Agormedah et al., 2022), adopt innovative teaching strategies, greater resilience in the

face of challenges (Tschannen-Moran and Hoy, 2001; Pfitzner-Eden, 2016; Snyder and Fisk, 2016; Agormedah et al., 2022), organize classroom activities effectively and deliver high-quality instruction (Klassen et al., 2011; Zee and Koomen, 2016). All of which contribute to improved student outcomes (Caprara et al., 2006). In opposition, with low self-efficacy beliefs, teachers perceive minimal control over student learning outcomes, which often leads to resistance to pedagogical change and a tendency to maintain low expectations for their students (Ashton and Webb, 1986). This diminished sense of efficacy is also linked to higher levels of teacher burnout (Klassen and Chiu, 2010), negative classroom climates, and reduced student engagement and achievement (Gibson and Dembo, 1984).

Empirical studies have investigated how various demographic factors influence teachers' self-efficacy beliefs, revealing nuanced and sometimes context-dependent relationships. Gender has been shown to play a role, with some studies suggesting that female teachers report higher efficacy (Brandon, 2000; Klassen and Chiu, 2010; Miralles-Cardona et al., 2022). However, findings across contexts remain mixed, and cultural norms may mediate these patterns (Tschannen-Moran and Hoy, 2007). Regarding educational level, teachers with advanced degrees tend to exhibit higher efficacy beliefs (Hoy and Spero, 2005). Specialization also matters, as STEM fields often report different efficacy profiles, potentially reflecting differences in training or instructional challenges (Wolters and Daugherty, 2007). On the other hand, professional training has been identified as a significant predictor of teacher efficacy. Teachers who have undergone continuous professional development or pre-service training tailored to instructional improvement tend to report stronger efficacy beliefs (Cantrell and Callaway, 2008; Klassen and Tze, 2014). Lastly, employment status can influence efficiency, with more secure employment often correlating with higher confidence and commitment to instructional quality (Dembo and Gibson, 1985). Together, these studies suggest that demographic variables can significantly shape how teachers perceive their ability to impact student learning.

In light of prior research emphasizing the foundational role of pre-service teacher self-efficacy in shaping inclusive, equity-focused, and policy-responsive pedagogical practices (Cochran-Smith, 2004; Sabbe and Aelterman, 2007; Usher and Pajares, 2008; Tschannen-Moran and McMaster, 2009; UNESCO, 2019), the present study seeks to explore the self-efficacy beliefs of primary pre-service teachers enrolled in Moroccan CRMEFs in relation to their capacity to integrate a gender-sensitive approach into their teaching. Specifically, this study aims to assess how various demographic factors (gender, educational background, area of specialization, type of training, and employment status) shape and influence their perceived teaching efficacy. By addressing the intersection of self-efficacy and demographic variables within the context of gender integration, this research contributes a novel perspective to the discourse on teacher preparation and educational equity, which underscores the originality of this work. This is consistent with recent research highlighting the importance of reflective practices in strengthening teacher self-efficacy (Cardona-Moltó and Miralles-Cardona, 2022). Generally, it contributes to the theoretical discourse on teacher identity, social justice education, and gender pedagogy, and highlights the role of personal

and academic demographic factors in shaping future teachers' confidence in implementing inclusive practices. Practically, the study underscores the need for more targeted and consistent integration of gender-related content in teacher training programs. It suggests that teacher education institutions should consider students' diverse backgrounds when designing interventions to build confidence in gender-sensitive teaching. Policymakers and educators can use these insights to develop training strategies that ensure all future teachers are equally prepared to create inclusive learning environments.

Although this study adopts a broad gender perspective, it focuses primarily on the self-efficacy of female pre-service teachers, who constitute the majority of the sample. This emphasis reflects both the demographic realities of the teacher training population and the crucial role that female educators can play in promoting inclusive classroom practices.

Research questions

This study highlights the importance of integrating the gender approach in today's learners for the country's development and contributes to identifying the current state of pre-service teachers' self-efficacy for gender equality practice. It seeks to answer following research questions:

> QR1. What is the level of self-efficacy of primary pre-service teachers in integrating a gender approach?
> QR2. Is there any significant difference in the level of self-efficacy of primary pre-service teachers based on gender, educational level, specialty, training and employment?

Based on the context of teacher training in Morocco, the study develops and outlines specific hypotheses that aim to clarify both the anticipated levels of self-efficacy and the potential differences influenced by various demographic and training-related factors.

For Research Question 1 (QR1), this research predicts there will be a high or moderate degree of self-efficacy among Moroccan primary pre-service teachers in terms of incorporating gender-sensitive practices into their practice. This hypothesis is grounded in the increasing incorporation of gender equality and human rights principles into teacher training programs across Morocco, suggesting that future teachers are likely exposed to these concepts and develop some confidence in their ability to apply them in the classroom.

Concerning differences in self-efficacy across various demographic and training variables (QR2), we propose several specific hypotheses. First, it is expected that female trainee teachers will report significantly higher levels of self-efficacy in integrating the gender approach compared to their male counterparts, potentially reflecting greater awareness and exposure to gender issues. Second, trainees specializing in law are hypothesized to demonstrate significantly higher self-efficacy in this domain than those from other academic specializations, attributed to their background in human rights and equality. Conversely, we anticipate no statistically significant difference in technical competency related to gender approach integration between

first-year and second-year trainees, suggesting a similar acquisition of foundational skills regardless of the training year.

Literature review

Curriculum reform and integration of gender approach

Recent reforms in Morocco's education system, particularly those guided by the Strategic Vision 2015–2030 and Framework Law 51.17, highlight the importance of integrating a gender-sensitive approach into the curriculum. These reforms aim to foster equity and inclusiveness in educational settings, aligning with UNESCO's 2019–2025 Gender Equality Strategy, which supports the transformation of education systems to advance gender equality and empower girls and women through inclusive and equitable education (UNESCO, 2019). Furthermore, they are reflected in initiatives led by national bodies like the CSEFRS, which have called for more effective adoption by ensuring enabling qualitative conditions within curricula and teaching programs (UNESCO, 2019). Morocco has adopted several institutional and policy-level measures, often in collaboration with international partners such as UNESCO, USAID, and MCA, to mainstream gender across economic, legal, social, and educational domains (Akerbib et al., 2020; Millennium Challenge Account [MCA], 2021; Jebli et al., 2021). Notably, initiatives like the Higher Education Partnership Program—Morocco (HEP-M) have updated training tools to promote gender equity in bilingual primary education (USAID, 2023).

The gender approach is a strategic framework aimed at achieving equality of rights, responsibilities, and access to resources between men and women. It emphasizes the empowerment of women and the universal recognition of human rights and justice for all. According to UNICEF (2017), a clear understanding of gender-related concepts is fundamental to fostering equity and inclusive development. In educational contexts, the gender approach involves the systematic consideration of gender norms, inequalities, and roles in curriculum content, pedagogy, and school environments. Its integration is essential to creating equitable learning opportunities, dismantling gender-based barriers, and challenging stereotypes that limit students' potential (UNESCO, 2020). Core dimensions of this approach include promoting inclusive classroom practices, ensuring equal participation, and utilizing gender-responsive teaching materials (Unterhalter et al., 2014). By embedding these principles, education systems can become transformative spaces that defend human rights and foster social justice for all learners. Moreover, as education systems strive toward inclusivity and sustainability, embedding gender equity within pedagogical innovations becomes imperative. These strategies also enhance learning outcomes by creating environments where all students can thrive. Additionally, gender-responsive education contributes to the achievement of Sustainable Development Goal 4, which advocates for inclusive and equitable quality education for all (United Nations [UN], 2015). Training educators to recognize and address gender biases, reforming curricula to reflect diverse perspectives, and incorporating participatory teaching methods are vital steps in this process.

Thus, a gender-focused lens in pedagogical innovation not only enhances equity but also supports the long-term transformation of education systems.

Theoretical basis: self-efficacy theory

Self-efficacy theory, developed by Bandura (1995) 1997, refers to individuals' beliefs in their capacity to organize and execute the actions required to manage future situations effectively. It's a central element of social cognitive theory and has significant implications for understanding human behavior, motivation, and performance. Using this idea, Bandura created the Social Cognitive Theory of Human Functioning and attempted to provide a theoretical framework that would explain the social and human elements that contribute to the formation of an individual's identity (Bandura, 1995; Di Tullio, 2019). He argued that social and human elements influence people's self-efficacy, which in turn influences both ordinary and extraordinary life choices. According to Bandura, and as supported by several studies, the key theoretical foundations of self-efficacy include individual, environmental, and behavioral factors (Di Tullio, 2019).

In the educational field, teaching efficacy beliefs specifically pertain to a teacher's perception of their ability to facilitate student learning, manage classrooms, and implement innovative practices. These beliefs are not fixed traits but dynamic perceptions shaped by teachers' experiences, context, and feedback. Tschannen-Moran and Hoy (2001) propose that teaching efficacy can be broken down into three core dimensions: instructional efficacy (confidence in delivering engaging, effective lessons), classroom management efficacy (ability to handle student behavior and create a positive learning atmosphere), and student engagement efficacy (belief in motivating and supporting all learners, including those with diverse needs). These dimensions are interrelated and collectively influence how teachers respond to challenges, adapt to innovations, and maintain inclusive practices. High levels of self-efficacy are associated with greater persistence, enthusiasm, and a proactive approach to addressing students' needs, especially in challenging or diverse learning environments (Tschannen-Moran and Hoy, 2001; Zee and Koomen, 2016).

Teaching self-efficacy plays a vital role in shaping teachers' professional behavior, attitudes, and overall performance in the classroom. Teachers who believe in their ability to make a difference are more likely to adopt innovative, student-centered strategies and remain committed to educational equity. Importantly, self-efficacy influences not only instructional effectiveness but also teachers' emotional wellbeing and resilience to burnout. In the context of inclusive and gender-responsive pedagogy, strong self-efficacy is essential to overcoming resistance, implementing equity-oriented practices, and promoting a positive learning experience for all students. Consequently, reinforcing self-efficacy is a key goal in teacher preparation and professional development programs. The four primary sources of efficacy beliefs are: mastery experiences (personal successes or failures), vicarious experiences or modeling (observing what others do), verbal persuasion (the messages received from others), and physiological and emotional states (Bandura, 1995; Di Tullio, 2019). These sources interact dynamically throughout a teacher's career, influencing how they

perceive their effectiveness and shaping their ability to engage in innovative and inclusive teaching practices.

Empirical studies

Several recent empirical studies have explored the role of self-efficacy in implementing innovative approaches across various sectors. Self-efficacy is widely regarded as a core psychological factor influencing the adoption of inclusive and innovative pedagogies (Tschannen-Moran and Hoy, 2001; Guskey, 2002). These studies, based on social learning theory, consider that teacher effectiveness is influenced by external and internal factors. Additionally, drawing on social cognitive theory, these studies distinguish between outcome expectancy and efficacy expectancy, emphasizing the individual's belief in their ability to plan their work. Tschannen-Moran et al. (1998) provide an in-depth review of the literature on this concept, focusing on two main conceptual currents that have influenced the study of teacher efficacy (Tschannen-Moran et al., 1998). Within the teaching profession, a study of 1,415 teachers in Malaysia identified self-efficacy and transformational leadership as key predictors of innovative pedagogical practices (Zainal and Mohd Matore, 2021). Wang et al. (2025) emphasize that teacher self-efficacy is essential not only for sustaining pedagogical innovation but also for addressing systemic inequalities within educational systems. In 2016, research by Zee and Koomen (2016) supported this, demonstrating that teacher education programs that strengthen self-efficacy can significantly improve the adoption of inclusive teaching practices. It is important to emphasize that self-efficacy pertains to the perception of competence rather than the actual level of competence (Zee and Koomen, 2016).

These innovative approaches may include developing curriculum materials that are inclusive of all genders, fostering a classroom environment that values equity and respect for all genders, addressing gender biases in instruction, and appropriately attending to the needs of students concerning gender. Researchers such as Pajares (2005), Sadler et al. (2012), Di Tullio (2019) have explored gender differences. Studies by Chapin and Warne (2020), Skovgaard and Chapin (2021) indicate that gender-conscious pedagogical methods not only promote equity in the classroom but also improve student learning outcomes (Chapin and Warne, 2020; Chapin et al., 2020; Skovgaard and Chapin, 2021). Furthermore, research has shown that inclusive teaching practices can positively influence students' attitudes, engagement, and success in subjects traditionally dominated by one gender (Riegle-Crumb et al., 2019; Dorji, 2020). As noted in the work of Oulhou and Ibourk (2021), other research has also demonstrated a strong correlation between instructor self-efficacy and student performance. Factors influencing teachers' self-efficacy in integrating gender approaches include individual elements such as past experience and understanding of gender issues in education, attitudes and beliefs about gender parity, and self-efficacy in general teaching techniques (Brandon, 2000; Miralles-Cardona et al., 2022). Behavioral aspects include participation in the development and use of gender-inclusive teaching techniques, the use of gender-sensitive evaluations in

the classroom, and reflection and self-evaluation of teaching methods through a gender lens (Miralles-Cardona et al., 2022). This research indicates that female pre-service teachers often demonstrate higher levels of efficacy in implementing gender-equity-focused instruction, frequently attributed to heightened sensitivity to social justice issues. Conversely, Agormedah et al. (2022) found no significant gender-based differences in self-efficacy among Ghanaian teachers implementing a new standards-based curriculum, suggesting that contextual and cultural variables play a role in shaping these perceptions. Moreover, Agormedah et al.'s (2025) research in evidenced high teaching expectancy beliefs in instructional practices, classroom management, and student participation in curriculum implementation. Teacher gender significantly accounted for teachers' expectancy beliefs about curriculum implementation, with male teachers expressing greater teaching expectancy beliefs than female teachers (Agormedah et al., 2025).

Research has consistently shown that self-efficacy tends to increase with higher levels of education (Bandura, 1997; Pajares and Schunk, 2001). Individuals with higher levels of education often report stronger beliefs in their abilities, likely due to enhanced learning experiences, skill development, and opportunities for mastery (Multon et al., 1991). For instance, university students generally express greater confidence in their capabilities compared to those in secondary or vocational education (Chemers et al., 2001). Friedman and Kass (2002) define teacher self-efficacy as a teacher's belief in their ability to effectively fulfill professional responsibilities and navigate the interpersonal dynamics of teaching, both in the classroom and within the broader school setting. Furthermore, educational programs incorporating active learning, problem-solving, and collaboration have been linked to improvements in self-efficacy (Wang et al., 2025). Ferdousi et al.'s (2025) research in found that entrepreneurial education not only provides students with practical skills but also significantly boosts their entrepreneurial self-efficacy. In a related study in Ghana, researchers observed that while teachers were generally proficient in designing and delivering lessons, many lacked confidences in managing classroom behavior. To address this, the study recommended regular training and professional development workshops focused on enhancing classroom management skills and ensuring more effective curriculum implementation (Agormedah et al., 2022).

Self-efficacy levels vary across disciplines, particularly between educators and students in specialized fields. Among teachers, special education teachers exhibit the highest self-efficacy scores across all dimensions measured, while specialized teachers tend to have the lowest self-efficacy scores. A large-scale study of Finnish teachers demonstrated this pattern, showing that self-efficacy increases with professional experience but plateaus in mid-career (Saloviita and Almulla, 2024). Miralles-Cardona et al. (2023) emphasize that academic training grounded in reflective and critical analysis contributes to higher levels of self-efficacy in applying gender-equity teaching practices. A study of medical disciplines found no significant differences in self-efficacy levels across disciplines or graduate years, suggesting that in some fields, the area of study may not significantly impact self-efficacy (Milam et al., 2019).

Self-efficacy is generally expected to grow as pre-service teachers progress through their training. Bandura (1995), Tschannen-Moran and Hoy (2007) contend that exposure to classroom environments, mentorship, and successful teaching experiences strengthen confidence over time. Self-efficacy expectations following training are influenced by the quality and type of training, the individual's educational background, experience, and, to some extent, gender. Higher education and accumulated experience consistently enhance self-efficacy, while effective training that incorporates skill-building experiences and positive reinforcement maximizes self-efficacy. Most research on pre-service teacher self-efficacy has been conducted in specific mathematics courses or using basic scientific methods, as seen in the study by Menon et al. (2023). However, investigations into the ability of future STEM teachers to teach in a gender-equitable manner have been the focus of studies like the one by Miralles-Cardona et al. (2023). Among special education students who received practical training, perceived self-efficacy was generally high, particularly in the use of modern technology. In Tanzania, a survey of 125 mathematics teachers revealed that self-efficacy in technology integration was moderate and influenced by factors such as gender and prior training (Njiku et al., 2022). Research by Zimmerman, as cited in Di Tullio (2019), also found that self-efficacy for self-regulated learning contributes to students' motivational beliefs and academic success.

The influence of teaching experience and employment status on self-efficacy is inconclusive. While practical experience may enhance efficacy in areas like classroom management, Agormedah et al. (2022) found no consistent differences between employed and non-employed teachers regarding their confidence in implementing an equity-based curriculum. These findings suggest that experience alone is not sufficient; reflective practices, targeted support, and inclusive pedagogical frameworks are also essential. Individuals with stable or permanent employment tend to have higher self-efficacy than those in part-time, temporary, or precarious jobs, as demonstrated by Falco et al. (2017) and others. Employees in management or planning positions also tend to exhibit higher self-efficacy because their roles provide more autonomy and initiative. Conversely, employees with lower status or high levels of supervision may lack opportunities to develop confidence. These differences in employment status can significantly affect job satisfaction, motivation, performance, and willingness to innovate (Mumtaz and Parahoo, 2020; Uppathampracha and Liu, 2022; Hu et al., 2023; Namono et al., 2024; Ferdousi et al., 2025).

Measuring teachers' self-efficacy is complex, involving various conceptualizations and measurement methods. Given its importance in teachers' professional development, several widely accepted scales have been developed to assess science teachers' self-efficacy (Malandrakis et al., 2018). The Teacher Efficacy for Gender Equality Practice (TEGEP) scale, developed and discussed by Miralles-Cardona et al. (2022) 2023, is a valuable tool for measuring teachers' self-efficacy in gender-sensitive teaching. The TEGEP scale has demonstrated acceptable measurement invariance across countries and sexes, making it a reliable instrument for assessing self-efficacy for gender-sensitive teaching among pre-service STEM teachers (Miralles-Cardona et al., 2023). In Morocco, the Norwegian Teacher Self-Efficacy Scale (NTSES) was used in a study of Moroccan primary teachers by Oulhou and Ibourk (2021).

The present study will employ the TEGEP scale developed by Miralles-Cardona et al. (2022).

It is important to note that the training of future teachers in the effective adoption of gender-sensitive methods remains relatively understudied in Morocco, particularly concerning their self-efficacy in implementing gender-sensitive pedagogical practices in relation to their demographic characteristics. Therefore, the present study aims to address this specific gap.

Materials and methods

Participants and setting

Participants in this study were trainee teachers in their first and second years of initial training for bilingual primary teaching at the Regional Centers for Education and Training Professions (CRMEFs) in Morocco. They represented six regions: Fès-Meknès, Tanger-Tetouan-Al Hoceima, Rabat-Salé-Kénitra, Souss-Massa, Drâa-Tafilalt, and the Eastern Region. Trainee teachers were admitted to the CRMEFs through a two-tier process involving a written test and an interview.

The sample comprised 392 trainee teachers: 343 in their first year of initial training and 49 in their second year. All participants were under 30 years of age, as required for CRMEF admission. The sample was predominantly female, 76.53% ($n = 300$), with male participants constituting 23.47% ($n = 92$). Data were collected during the 2022–2023 academic year (second-year trainees) and the 2023–2024 academic year (first-year trainees).

Participants had diverse academic backgrounds, holding bachelor's degrees from various state institutions across different fields, including Economics and Management, Public and Private Law, Science, Literature, and Islamic Studies. Some participants graduated from specialized educational training institutions: the Faculty of Education Sciences (FSE), the Higher Normal School (ENS), and the Higher School of Education and Training (ESEF).

The training program at CRMEFs spans 2 years. The first year consists of two stages, each comprising 10 training modules delivered over 27 weekly hours, with examinations in April and July. First-year trainees also participate in weekly elementary school internships for observation and teaching practice. Second-year trainees assume full responsibility for assigned classes in schools. Notably, the initial training program includes no modules addressing gender approaches or their implementation, nor is this approach referenced in any module syllabi.

Procedures

Data collection involved an anonymous and voluntary online questionnaire distributed to participants across the six regions. Additionally, five focus groups were conducted on-site at CRMEFs, with 14 first-year trainees (seven female, seven male) per group. Each session lasted approximately 30 min. Ethical approval was obtained from administrative authorities. Participants were informed about the study's objectives, their rights, and the confidentiality of data. The questionnaire was administered from 14 April to 15 May 2024.

Measures

Teacher self-efficacy for gender equality practice (TEGEP) scale

The primary instrument was an adapted version of the TEGEP scale (Miralles-Cardona et al., 2022). The questionnaire consisted of 26 items from the original TEGEP scale plus one additional item about primary-level subjects suitable for implementing gender approaches. The TEGEP scale has a 6-point Likert-type structure, with responses ranging from 1 (strongly disagree) to 6 (strongly agree). The scale showed excellent reliability (Cronbach's $\alpha = 0.92$), well above the acceptable threshold of.70 (Nunnally and Bernstein, 1994). Previous validation studies by Miralles-Cardona et al. (2022) 2023 demonstrated strong construct validity, with confirmatory factor analyses supporting the three-factor model structure of the instrument. Measurement invariance across gender and national contexts has also been established, confirming that the TEGEP scale reliably measures gender-related teaching self-efficacy in diverse educational settings. These psychometric properties validate its use in the current Moroccan context.

The questionnaire was organized into three main axes:

- Gender Knowledge and Awareness
- Implementing or managing gender-responsive teaching methods
- Developing Gender Attitudes

The first axis examined trainee teachers' representations of the gender approach. The second assessed the impact of academic training on trainees' self-efficacy representations, implementation, and management in teaching methods. The third axis compared self-efficacy integration between 1st- and 2nd-year trainees and the development of self-efficacy practices.

Focus group method

A semi-structured interview method was developed to facilitate the focus group discussions. Additional details are provided in the Supplementary material. The method followed a five-step process proposed by Nagle and Williams (2013): (i) Purpose of the study, (ii) Conceptualization and logistics, (iii) Facilitation, (iv) Analysis, and (v) Report/Presentation of results. An interview guide was developed to maintain focus on the three research axes and ensure equal participation of men and women.

To ensure the trustworthiness of the qualitative data, several strategies were employed:

Credibility

Credibility, which refers to the confidence in the truth of the findings, was ensured through several measures. First, a semi-structured interview guide, based on the main research themes, was used to maintain focus and consistency across discussions. This guide was developed to cover the key areas of gender knowledge and awareness, implementation of gender-responsive teaching methods, and the development of gender attitudes. Second, prolonged engagement with the data was achieved through repeated readings of the transcripts and detailed note-taking during the focus group sessions. Finally, peer debriefing involved

regular discussions among the research team to review and refine interpretations of the data, minimizing researcher bias.

Transferability

Transferability, the extent to which the findings can be applied to other contexts, was enhanced by the choice of participants from different CRMEFs across six regions of Morocco. This heterogeneity in the sample allowed for the capture of a range of perspectives and experiences, increasing the potential for the findings to be relevant to similar teacher training programs in other regions. Detailed descriptions of the participants, the context of the study, and the data collection process are provided to enable readers to make informed judgments about the applicability of the findings to their own settings.

Dependability

Dependability, which addresses the stability and consistency of the findings over time, was ensured through a rigorous documentation of all stages of the research process. This included maintaining detailed records of the interview guide development, participant recruitment, data collection procedures, and the analysis process. An audit trail, consisting of transcripts, field notes, and coding decisions, was established to allow for an external review of the research process.

Confirmability

Confirmability, the neutrality of the findings, was enhanced by maintaining a clear record of the coding process and remaining true to the participants' words. Direct quotes from participants are used extensively in the report to support the findings and provide rich contextual detail. Reflexivity, where the researchers critically examined their own biases and assumptions, was employed throughout the study to minimize their influence on the data and its interpretation. This involved keeping a reflective journal to document personal thoughts and reactions during the research process and discussing potential biases within the research team.

Design and data analytic plan

The study employed a mixed-methods design combining quantitative survey data with qualitative focus group information.

For quantitative analysis, comparisons of means by specialty and professional status were conducted using one-way analysis of variance (ANOVA). We used independent samples t-tests to compare by gender, degree, and year of training. Effect sizes were estimated using eta squared and *Cohen's d* (Cohen, 1988). To control for Type I error associated with multiple comparisons conducted on the same measure, the significance threshold was adjusted using the Bonferroni correction.

Qualitative data from focus groups were recorded and transcribed using Transana software (Woods, 2019), which specializes in video and audio analysis. The software facilitated both *a priori* and ongoing analysis by defining categories with associated keywords and assigning these to audio segments. Focus group sessions were divided into three episodes corresponding to the three research axes, with each episode characterized using categories and associated keywords.

Results

TEGEP scale results

Among the returned questionnaires, 0.8% contained missing or incomplete values and were therefore excluded. The final sample consisted of 392 participants, with 300 (76.5%) identifying as female and 92 (23.5%) as male. The mean age of the respondents was 24.54 years (SD = 2.44, range = 20–30). Additionally, 91.1% held a bachelor's degree, while 8.9% held a master's degree. The most represented academic disciplines were experimental sciences (30.9%) and economics (30.9%). The least represented disciplines were education sciences and Islamic studies.

The means and standard deviations for gender-related knowledge, pedagogy, and attitudes were calculated for the overall sample of primary pre-service teachers. The total scale produced a mean score of 3.97 (SD = 0.85), indicating a generally favorable orientation. The gender-related knowledge subscale had a mean of 3.20 (SD = 0.81), whereas the gender-sensitive pedagogy subscale showed a higher mean of 4.52 (SD = 1.13). The gender-related attitudes subscale yielded the highest mean score of 4.55 (SD = 1.22), reflecting positive attitudes toward integrating gender perspectives into educational practice.

Does the self-efficacy of primary pre-service teachers in integrating a gender approach vary by gender?

Gender differences in teacher self-efficacy for gender equity (GE) practice were examined using independent-samples t tests, as presented in Table 1. Results revealed a statistically significant difference between female and male teachers on the total self-efficacy scale, $t(390) = 2.87$, $p = 0.005$, $d = 0.36$, with females reporting higher self-efficacy (M = 4.04, SD = 0.05) than males (M = 3.73, SD = 0.10). A significant difference was also found for gender pedagogy, $t(390) = 4.02$, $p < 0.001$, $d = 0.48$, again indicating higher scores for female teachers (M = 4.64, SD = 0.06) than for

male teachers (M = 4.11, SD = 0.13). However, no statistically significant differences were found for gender knowledge or gender attitudes, as their p values did not meet the Bonferroni-adjusted significance threshold ($p < 0.017$).

Does the trainee's self-efficacy in integrating gender approach depend on his area of academic specialization?

For the data presented in Table 2, Bonferroni correction was not applied to the omnibus ANOVA tests, as such adjustments are generally reserved for *post hoc* pairwise comparisons rather than overall model effects. An analysis of variance was conducted to compare teacher self-efficacy for gender equity (GE) practices across specialties. For the total scale, there was a statistically significant effect of specialty, F(5, 386) = 2.62, $p = 0.024$. For the subscales, the effect of specialty was not significant for gender knowledge, F(5, 386) = 0.72, $p = 0.612$, but was significant for gender pedagogy, F(5, 386) = 2.96, $p = 0.012$, and for gender attitudes, F(5, 386) = 3.52, $p = 0.004$. Descriptive statistics for each specialty and factor are presented in Table 2.

Is the self-efficacy of trainees related to the formative year?

As shown in Table 3, no statistically significant differences in teacher self-efficacy for gender equity (GE) practice were found between participants holding a bachelor's degree and those with a master's degree. This was the case for the total self-efficacy scale, $t(390) = -0.10$, $p = 0.920$, $d = -0.02$, as well as for the subscales of gender knowledge, $t(390) = -0.58$, $p = 0.561$, $d = -0.10$; gender pedagogy, $t(390) = -0.15$, $p = 0.881$, $d = -0.03$; and gender attitudes, $t(390) = 0.66$, $p = 0.510$, $d = 0.12$. None of the comparisons met the Bonferroni-adjusted significance threshold ($p < 0.017$).

As presented in Table 4, no statistically significant differences were found in teacher self-efficacy for gender equity (GE) practice according to the year of training. Although the total self-efficacy score was slightly higher among first-year trainees (M = 4.00, SD = 0.04) compared to second-year trainees (M = 3.77, SD = 0.15), the difference did not reach the Bonferroni-adjusted significance threshold, $t(390) = 1.45$, $p = 0.154$, $d = 0.24$. The same trend was observed across the subscales of gender knowledge [$t(390) = 1.85$, $p = 0.065$, $d = 0.28$], gender pedagogy [$t(390) = 1.51$, $p = 0.137$, $d = 0.25$], and gender attitudes [$t(390) = 0.26$, $p = 0.795$, $d = 0.04$], none of which showed statistically significant differences based on the adjusted threshold ($p < 0.017$).

No statistically significant differences in teacher self-efficacy for gender equity (GE) practice were found based on participants' employment status. Although full-time students reported slightly higher scores on the total scale (M = 4.11, SD = 0.06) compared to other groups, the overall difference did not reach statistical significance, F (5, 386) = 1.69, $p = 0.155$. Similarly, no significant differences were observed for the subscales of gender knowledge (F = 1.11, $p = 0.355$), gender pedagogy (F = 2.17, $p = 0.071$), or gender attitudes (F = 0.89, $p = 0.469$). All p values exceeded the Bonferroni-adjusted threshold of.0025, indicating that employment status was not a statistically significant factor in participants' self-efficacy levels across any of the measured dimensions.

TABLE 1 Teacher self-efficacy for gender equity (GE) practice: descriptive and comparison of means by sex.

Whole sample	Sub samples	M	SD	t	P	Cohen's d
Total scale	Female	4.04	0.05	2.87	0.005*	0.36
	Male	3.73	0.1			
Gender knowledge	Female	3.23	0.05	1.21	0.226	0.15
	Male	3.12	0.09			
Gender pedagogy	Female	4.64	0.06	4.02	< 0.001*	0.48
	Male	4.11	0.13			
Gender attitudes	Female	4.63	0.07	2.11	0.037	0.26
	Male	4.30	0.14			

*Indicates significance based on the adjusted threshold. Scale range = 1–6 (min = 1, max = 6, midpoint = 3.50); *df* = 390. *P*-values were Bonferroni-adjusted; $p < 0.017$ was considered statistically significant.

TABLE 2 Teacher self-efficacy for gender equity (GE) practice: descriptive and comparison of means by specialty.

Whole sample	Subsamples	M	SD	F	P
Total scale		3.97	0.852		
Factors	Specialty				
Total scale	Economic sciences	3.93	0.08	2.62	0.024
	Islamic studies	3.56	0.23		
	Legal sciences	3.85	0.11		
	Human sciences	4.26	0.12		
	Exact sciences and mathematics	3.96	0.07		
	Educational sciences	4.30	0.16		
Gender knowledge	Economic sciences	3.19	0.08	0.716	0.612
	Islamic studies	3.25	0.22		
	Legal sciences	3.12	0.09		
	Human sciences	3.32	0.13		
	Exact sciences and mathematics	3.19	0.07		
	Educational sciences	3.44	0.20		
Gender pedagogy	Economic sciences	4.50	0.11	2.962	0.012
	Islamic studies	3.75	0.32		
	Legal sciences	4.36	0.14		
	Human sciences	4.92	0.16		
	Exact sciences and mathematics	4.52	0.10		
	Educational sciences	4.82	0.21		
Gender attitudes	Economic sciences	4.44	0.12	3.52	0.004
	Islamic studies	3.85	0.31		
	Legal sciences	4.43	0.15		
	Human sciences	5.01	0.17		
	Exact sciences and mathematics	4.56	0.10		
	Educational sciences	5.13	0.18		

Scale range = 1–6 (min = 1, max = 6, midpoint = 3.50); df = (5, 386). P-values were Bonferroni-adjusted; with 24 tests, the significance threshold was set at $p < 0.05$.

TABLE 3 Teacher self-efficacy for gender equity (GE) practice: descriptive and comparison of means by educational level.

Whole sample	Subsamples	M	SD	t	P	Cohen's d
Total scale	Bachelor's degree	3.97	0.05	−0.10	0.920	−0.02
	Master's degree	3.98	0.11			
Gender knowledge	Bachelor's degree	3.20	0.04	−0.58	0.561	−0.10
	Master's degree	3.28	0.10			
Gender pedagogy	Bachelor's degree	4.51	0.06	−0.15	0.881	−0.03
	Master's degree	4.54	0.19			
Gender attitudes	Bachelor's degree	4.57	0.07	0.66	0.510	0.12
	Master's degree	4.42	0.18			

Scale range = 1–6 (min = 1, max = 6, midpoint = 3.50); df = 390. P-values were Bonferroni-adjusted; $p < 0.017$ was considered statistically significant.

Focus groups results

To complement the quantitative findings and better understand the perceptions of prospective primary school teachers, three focus groups were conducted with a total of 42 participants. The discussions were analyzed thematically, with key concepts and their interrelationships visualized using concept maps. These maps highlight the prospective teachers' collective understanding and perspectives regarding gender-related knowledge, its application, and suggestions for development. Analysis of the focus groups identified several key categories for the three main thematic

TABLE 4 Teacher self-efficacy for gender equity (GE) practice: descriptive and comparison of means by year of training.

Whole sample	Subsamples	M	SD	t	P	Cohen's d
Total scale	First year of basic training at the center	4.00	0.04	1.45	0.154	0.24
	Second year of basic training	3.77	0.15			
Gender knowledge	First year of basic training at the center	3.23	0.04	1.85	0.065	0.28
	Second year of basic training	3.00	0.13			
Gender pedagogy	First year of basic training at the center	4.55	0.06	1.51	0.137	0.25
	Second year of basic training	4.25	0.20			
Gender attitudes	First year of basic training at the center	4.56	0.06	0.26	0.795	0.04
	Second year of basic training	4.51	0.20			

Scale range = 1–6 (min = 1, max = 6, midpoint = 3.50); df = 390. P-values were Bonferroni-adjusted; $p < 0.017$ was considered statistically significant.

TABLE 5 Pre-service teacher's proposals for the implementation of the gender responsive teaching method.

Keyword	Providing equal opportunities to all students	Planning strategies to teach with a gender	Respecting the different gendered needs and styles of learning	Creating learning environments that foster gender collaboration	Educating on gender issues	integration of this approach in rural areas only
Frequency	22	12	6	6	2	2

episodes: gender knowledge and awareness, implementing gender-sensitive practices, and developing gender-related attitudes. These categories were described using keywords such as "gender roles," "planning gender-sensitive strategies," and "challenging stereotypes," reflecting the diversity of participants' perspectives and experiences.

Gender knowledge and awareness (episode 1)

This category includes keywords such as "gender equality legislation," "gender equality vs. gender equity," "gender roles," "absence of gender discrimination," "specific functions," and "gender stereotypes." The participants in this discussion were both men and women. Their undergraduate majors covered a wide range of fields: Arabic studies, education, law, management, economics, philosophy, Islamic studies, life sciences, physical sciences, physiology and health, and geography. Participants demonstrated a nuanced understanding of gender concepts. For instance, they clearly distinguished between gender equality and gender equity, often citing constitutional and legal references. Several mentioned Article 19 of the Moroccan Constitution and international conventions. Both male and female participants emphasized the importance of non-discrimination and the sociocultural construction of gender, articulating that gender identity involves roles, functions, and tasks shaped by society.

Implementing or managing gender-responsive approaches (episode 2)

Keywords associated with this episode include "creating learning environments that foster gender collaboration," "educating on gender issues," "integrating this approach only in rural areas," "planning teaching strategies that integrate a gender perspective," "providing equal opportunities for all students," and "respecting different gender-related needs and learning styles." Participants were both men and women. Their undergraduate majors remained the same as in Episode 1.

During the discussion, participants proposed several ways to implement the gender approach in the classroom. The most frequently mentioned was "providing equal opportunities to all students," followed by "planning gender-sensitive teaching strategies" and "respecting gender-related needs and learning styles." Many highlighted the importance of creating inclusive learning environments that encourage collaboration between male and female students. These qualitative results align with the quantitative findings regarding high self-efficacy in pedagogical implementation.

Developing gender-related attitudes (episode 3)

This category is associated with keywords such as "transmit/instill gender-sensitive attitudes," "deconstruct gender stereotypes and prejudices," and "support school-community connections to promote gender equality." The participants were both men and women, and their undergraduate majors also corresponded to those of the previous episodes. Participants suggested a variety of pedagogical practices to strengthen gender-sensitive attitudes (Table 5). These included analyzing classroom dynamics to identify gender-based challenges, designing inclusive activities, encouraging mixed-gender group work, and promoting cooperation and respect for differences. Several participants emphasized the need to involve families and communities to foster awareness beyond the classroom. These suggestions demonstrate their readiness to actively support a gender-equitable educational environment.

Discussion

RQ1

Pre-service teachers showed generally favorable overall self-efficacy (M = 3.97, SD = 0.85). Scores were especially high

for gender-responsive pedagogy (M = 4.52) and gender-related attitudes (M = 4.55), indicating strong confidence in applying gender-sensitive practices and a positive disposition toward gender equity. These findings are consistent with previous research reporting high attitudinal support for gender equality among teacher candidates (Unterhalter, 2017; Tarman and Güven, 2019). The focus group discussions reinforced these results by highlighting practical strategies such as "creating inclusive learning environments" and "planning gender-sensitive lessons," mirroring the strong scores in pedagogical domains. However, gender knowledge scored lower (M = 3.20), suggesting a gap in conceptual understanding of more complex theoretical aspects, including intersectionality, which aligns with similar patterns reported by Tarman and Güven (2019).

RQ2

Female pre-service teachers scored significantly higher than males on overall self-efficacy and gender-responsive pedagogy, while no significant differences were found for gender knowledge or attitudes. These results suggest that women may feel more confident in implementing equity-based teaching practices, possibly due to socialization or heightened awareness of discrimination (Bandura, 2006; Czerniawski and Kidd, 2011). The predominance of female participants in the sample (76.5%) may have reinforced the positive overall orientation observed. These findings highlight that while the study addresses gender issues generally, its empirical approach is particularly relevant to female pre-service teachers. The overrepresentation of women in the sample, coupled with their higher self-efficacy scores, warrants a more nuanced interpretation of the study's gender implications, particularly in the context of supporting female teachers' professional development.

Differences related to academic specialization, degree level, and year of training were limited. The analysis of variance revealed overall effects associated with specialization, suggesting that certain disciplines may influence perceptions of the gender approach. However, these effects remain weak and do not indicate a strong influence of specialization. Similarly, no notable variation was observed between bachelor's and master's degree holders or between first- and second-year trainees, indicating that gender-responsive training is not yet systematically integrated into teacher education programs (Skerrett and Bomer, 2011; Zahid and Biyouda, 2022).

The findings highlight the urgent need to strengthen gender-related training within Moroccan teacher education programs (CRMEFs). Specifically, curricula should include dedicated modules on gender theory, addressing concepts such as equity, equality, social construction, and intersectionality to deepen pre-service teachers' conceptual understanding. In addition, practical workshops focusing on lesson planning, classroom management, and inclusive instructional strategies are essential to translate theoretical knowledge into classroom practice. Mentorship initiatives should also be developed, particularly to support male trainees and reduce the gender gap in self-efficacy for gender-responsive pedagogy. Leveraging the already high levels of pedagogical self-efficacy and positive attitudes observed among

trainees, these interventions can create a sustainable professional culture that promotes equity and inclusive teaching practices.

To complement and further substantiate these pedagogical recommendations, future research is needed to generate deeper empirical insights and guide evidence-based improvements. Longitudinal studies are essential for tracing the development of gender-sensitive self-efficacy among prospective teachers over time, while the application of multilevel modeling can enhance the robustness of statistical analyses. Expanding qualitative research into diverse and underserved contexts is also critical for capturing the influence of local dynamics. Moreover, validating self-reported measures through classroom observations and investigating the interplay between individual identity factors and institutional environments will offer a more nuanced understanding of gender-sensitive teaching. The development and rigorous evaluation of gender-training modules, remain key priorities for advancing equity in teacher education.

Conclusion

Summary of findings

This study explored the self-efficacy of pre-service primary school teachers in Morocco regarding gender equality practice by assessing their self-efficacy in the areas of gender knowledge and awareness, implementation of gender-responsive teaching methods, and development of gender-related attitudes. Using a mixed-methods approach with questionnaires and focus group discussions involving 392 trainees, the research produced several key findings. The main findings indicate that while pre-service teachers express a moderate level of confidence in their overall ability to teach gender education, a notable gap exists in their gender knowledge and awareness. This was demonstrated by lower quantitative self-efficacy scores for gender knowledge compared to pedagogy and attitudes, and qualitative feedback from the focus groups revealing difficulties articulating more complex gender concepts. Consistent with previous research, female trainees demonstrated significantly higher self-efficacy in implementing gender equality than their male counterparts. However, analyses revealed no statistically significant differences in self-efficacy based on educational level, year of training, or professional status. Similarly, contrary to initial hypotheses, no statistically significant differences were found between university specializations regarding self-efficacy in practicing gender equity.

Limitations

Limitations of the study include its specific context within Moroccan teacher training institutions, which potentially limits the generalizability of the findings. The sample was based on voluntary participation from certain Moroccan regions, which may cause sampling bias and limit the generalizability of the results. From a statistical standpoint, the study did not model for clustering effects within training centers, which could result in underestimated standard errors and potential biases in statistical

significance. Moreover, the absence of preliminary checks for common method bias and distribution normality (such as skewness and kurtosis) constitutes a methodological limitation that may affect the robustness of the quantitative findings. There was also a gender imbalance in sample, with 76.5% of participants being female, which could have influenced the findings related to self-efficacy. The study's cross-sectional design provides only a single-time snapshot, preventing any causal conclusions or understanding of changes over time. The reliance on self-reported data introduces a risk of social desirability bias, even with assured anonymity.

These findings highlight the critical need for targeted interventions in teacher training programs. For research, Future studies should consider using multilevel modeling techniques to account for the hierarchical structure of the data, which would provide more accurate estimates and account for potential clustering effects. It would be beneficial to develop and empirically test gender-sensitive training modules aimed at addressing potential differences in self-efficacy development among male and female teacher trainees. Likewise, the future studies should examine the long-term impact of gender-focused training on actual classroom practices, using longitudinal designs and observational measures. Exploring the effectiveness of specific strategies to improve overall gender knowledge and awareness is also warranted. For practice, it is imperative to strengthen gender-related content in teacher education programs, going beyond basic concepts to include nuanced theoretical understandings. This involves providing pre-service teachers with the necessary knowledge, practical skills, and enhanced self-efficacy to effectively implement gender-responsive pedagogy. Emphasis must be placed on opportunities for practical application, collaborative learning, and addressing the identified gender gap in self-efficacy, particularly for male pre-service teachers.

Overall conclusion

In conclusion, this study highlights the critical need to address and strengthen pre-service teachers' self-efficacy in gender equality practice, particularly with regard to foundational knowledge. Strengthening teacher training to better prepare future educators in Morocco is critical to fostering equitable and inclusive learning environments, ensuring they are equipped with the confidence and comprehensive understanding needed for innovative and gender-responsive pedagogy.

Data availability statement

The original contributions presented in this study are included in this article/Supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent from the participants was not required to participate in this study in accordance with the national legislation and the institutional requirements.

Author contributions

Funding

Acknowledgments

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/feduc.2025.1532294/full#supplementary-material

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