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Exploring the relationship between physical preservice teacher education's self-efficacy and observed teaching behaviours in China

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Abstract

The current study investigates the relationship between preservice physical education (PE) teachers' self-efficacy and observed teaching behaviours in China. A mixed-methods approach was used to examine how self-efficacy in classroom management, instructional strategies, and student engagement affect actual teaching behaviours, based on Bandura's social cognitive theory. The study recruited 176 preservice PE teachers, using quantitative measures such as the teachers' sense of efficacy scale and systematic observation of teaching behaviours, along with qualitative interviews with 25 participants. Results showed a significant association between self-efficacy beliefs and teaching behaviours. Classroom management self-efficacy explained 17.64% of the variance in observed classroom management behaviours, and student engagement self-efficacy explained 1.7% of the variance in observed student engagement behaviours. The findings provide empirical evidence supporting the theoretical link between self-efficacy beliefs and teaching performance, offering important implications for PE programs in China amid ongoing educational reforms.

Keywords: *Bandura's theory; physical education; preservice teacher behaviour; preservice teacher education; teachers' self-efficacy*

1. Introduction

In recent years, the landscape of physical education (PE) in China has undergone significant transformation, driven by national educational reforms that prioritise student health and physical development. The 2024-2035 Master Plan on Building China into a Leading Country in Education has established ambitious goals for PE, mandating that all primary and middle school students engage in at least two hours of daily physical activity by 2027 (Ministry of Education of China, 2024). This policy shift reflects growing concerns about student health issues, including rising obesity rates and myopia prevalence, while simultaneously acknowledging the crucial role of PE in holistic student development. The reform emphasises the need for high-quality PE instruction and requires schools to develop comprehensive sports programs that integrate required PE classes, activity breaks, and extracurricular sports activities.

Within this context, the preparation and development of competent PE teachers have emerged as a critical priority. Chinese educational authorities have recognised that achieving these ambitious PE goals depends fundamentally on the quality of teaching personnel. The reform specifically calls for the construction of a new-type sports faculty comprising full-time teachers, coaches, and part-time staff, with particular emphasis on improving recruitment, training, and incentive mechanisms for PE teachers (Global Times, 2025). This systemic focus on teacher development aligns with international research demonstrating that teacher quality represents the single most important school-based factor influencing student outcomes (Hattie, 2009).

Nevertheless, a persistent research gap in teacher education worldwide is acknowledged as a theory-practice gap, which means that the disconnect between what preservice teachers learn in their preparation programs and what they actually implement in classroom settings. This research gap is particularly pronounced in PE, where the translation of theoretical knowledge into effective teaching practices requires not only cognitive understanding but also physical demonstration, environmental management, and real-time decision-making in dynamic settings. Research indicates that many preservice teachers struggle to apply theoretical

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concepts learned in university courses to actual teaching situations, leading to reduced confidence and effectiveness during their initial teaching experiences (Darling-Hammond, 2006).

Teacher self-efficacy is defined as teachers' beliefs in their capabilities to organise and execute courses of action required to produce desired outcomes in specific teaching situations. It has emerged as a crucial psychological construct in teacher education research. According to social cognitive theory (Bandura, 1977; 1997), self-efficacy beliefs influence teachers' motivation, persistence, resilience, and instructional practices. Previous studies showed that teachers with higher self-efficacy are more likely to implement innovative teaching strategies, maintain positive classroom environments, persist in the face of challenges, and ultimately achieve better student outcomes (Tschannen-Moran & Woolfolk, 2001; Klassen & Tze, 2014).

In the PE context, self-efficacy takes on additional significance due to the unique challenges of PE instruction. PE teachers not only demonstrate pedagogical competence but also possess specialised content knowledge, physical demonstration skills, and the ability to manage potentially hazardous physical activities. In addition, PE instruction often occurs in less structured environments (e.g., gyms, fields, pools) compared to traditional classroom settings. All of these mean that PE teachers need additional management skills and adaptability. Hence, the integration of sports and education in Chinese schools, as mandated by recent reforms, further complicates the PE teacher's role, necessitating what has been termed dual-qualified educators who combine pedagogical expertise with athletic training proficiency (Zhang et al., 2026).

While extensive research has established the importance of self-efficacy for teacher motivation and persistence, fewer studies have directly examined how self-efficacy beliefs translate into observable teaching behaviours. This gap is especially significant in the PE research domain, where the physical and environmental demands of teaching create unique challenges for preservice teachers. Therefore, understanding the mechanisms through which dimensions of self-efficacy influence teaching performance can inform more effective teacher preparation programs and support structures.

This study addresses several critical gaps in the existing literature on preservice teacher education among PE teachers in China. First, it examines the relationship between self-efficacy beliefs and observed teaching behaviours, providing empirical evidence about how psychological constructs manifest in actual teaching practice. Second, it investigates self-efficacy development during the crucial transition from preservice preparation to student teaching, offering insights into the factors that support or hinder efficacy development. Third, it explores the specific challenges and opportunities facing Chinese preservice teacher education among PE teachers within the context of ongoing educational reforms. In addition, to examine the psychometric properties of the teachers' sense of efficacy scale (TSES) when applied to preservice teacher education among Chinese PE teachers, validating its use in this specific cultural and disciplinary context.

Therefore, the research objectives of this study are: 1) to investigate the relationship between preservice teachers' self-efficacy beliefs (i.e., classroom management, instructional strategies, and student engagement) and their observed teaching behaviours during student teaching placements; 2) to identify the key factors that contribute to self-efficacy development during both the preservice preparation program and the student teaching experience; 3) to explore how self-efficacy beliefs influence preservice teachers' career intentions and commitment to the teaching profession; 4) to provide evidence-based recommendations for improving preservice teacher education in PE major in China, particularly in light of recent educational reforms emphasising physical education integration.

Accordingly, the significance of this research extends beyond theoretical contributions to practical implications for teacher education policy and practice. By elucidating the relationship between self-efficacy and teaching behaviours, the study provides concrete guidance for designing more effective teacher preparation programs. Furthermore, in the context of China's ambitious physical education reforms, understanding how to develop highly effective preservice teacher education among PE teachers represents a crucial step toward achieving national educational goals.

2. Literature Review and Hypotheses

2.1. The underpinning theory of the study

The social cognitive theory posits that human functioning results from the dynamic interaction of personal, behavioural, and environmental factors (Bandura, 1986; 1997). Central to this theory is the concept of self-efficacy, which means that people's judgments of their capabilities to organise and execute courses of action required to attain designated types of performances (Bandura, 1986). According social cognitive theory, self-efficacy beliefs influence individuals' choices of activities, effort expenditure, persistence in the face of obstacles, resilience to adversity, and ultimately, their performance accomplishments. Bandura (1997) identified four primary sources of self-efficacy information: mastery experiences (successful performances), vicarious experiences (observing others' successes), verbal persuasion (encouragement from others), and physiological/affective states (emotional and physical reactions). These sources operate differently across domains and developmental stages, with mastery experiences generally exerting the strongest influence on efficacy beliefs.

In the context of teacher education, this theoretical framework suggests that preservice teachers develop efficacy beliefs through their experiences in preparation programs, observations of effective teaching, feedback from mentors and peers, and their emotional responses to teaching challenges. The application of social cognitive theory to teacher education has been extensively validated in international research. Tschannen-Moran and Woolfolk (2001) developed the TSES

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based on Bandura's theoretical framework, identifying three key dimensions of teacher self-efficacy: efficacy for instructional strategies, efficacy for classroom management, and efficacy for student engagement. This tripartite conceptualisation has been widely adopted in teacher efficacy research and provides the theoretical foundation for the current study's examination of self-efficacy in specific teaching domains.

2.2. Physical education teacher education and reform in China

PE teacher education in China operates within a unique cultural and institutional context characterised by rapid educational reform, centralised curriculum development, and increasing emphasis on holistic student development. The Chinese educational system has traditionally prioritised academic achievement, often at the expense of physical education and extracurricular activities. However, recent policy shifts reflect growing recognition of the importance of physical health and well-being for student development.

The 2024-2035 Master Plan on Building China into a Leading Country in Education represents a watershed moment for PE in Chinese schools. This plan mandates significant increases in physical activity time, requires schools to develop comprehensive sports programs, and emphasises the need for high-quality PE instruction. Specifically, the plan requires that by 2027, all primary and middle school students engage in at least two hours of daily physical activity through required PE classes, activity breaks, and extracurricular sports (Ministry of Education of China, 2024).

These reforms have greatly increased demand for qualified PE teachers and changed PE teacher education programs. Chinese universities now develop specialised preservice programs that blend pedagogical skills, sports science, and coaching education. The concept of dual-qualified teachers, those possessing both teaching and coaching credentials, has gained prominence as schools strive to integrate sports and education more effectively (Zhang et al., 2026).

Despite these positive developments, significant challenges remain in Chinese PE preservice teacher education. Many PE preservice teachers have limited practical teaching opportunities, inadequate mentoring, and poor preparation for the diverse demands of modern PE instruction (Liu, 2024). Educational reform is advancing quickly, causing implementation challenges. Many teacher education programs struggle to update curricula and practices to meet new requirements.

2.3. Teacher self-efficacy in education

Research on teacher self-efficacy in PE has grown significantly over the past two decades, revealing both universal patterns and context-specific variations. Previous studies consistently demonstrate that PE teachers' self-efficacy beliefs influence their instructional practices, student engagement strategies, classroom management approaches, and professional commitment (Martin & Kulinna, 2003; Gurvitch & Metzler, 2009). A comparative analysis by Fackler et al. (2020) examined predictors of teacher self-efficacy across Nordic, Anglo-Saxon, and East and South-East Asian country clusters, revealing distinct cultural patterns in efficacy development. This study found that while all three domains of teacher self-efficacy (classroom management, instructional strategies, student engagement) showed different patterns of association with teacher, classroom, principal, and school predictors across cultural contexts, East and South-East Asian countries exhibited unique patterns compared to Nordic and Anglo-Saxon clusters. These findings underscore the importance of considering cultural context in understanding teacher efficacy development.

Recent longitudinal research has provided insights into the developmental trajectory of teacher self-efficacy. Burić et al. (2024) conducted a three-wave longitudinal investigation of 1,030 secondary school teachers, finding that all three dimensions of teacher self-efficacy predicted teaching quality, but teaching quality, in turn, predicted only teacher efficacy for student engagement. This reciprocal relationship highlights the dynamic nature of efficacy development and suggests that different efficacy domains may follow distinct developmental patterns. Another longitudinal study demonstrates that self-efficacy typically increases during teacher preparation programs but may decline during the initial teaching experience, a phenomenon often termed reality shock (Woolfolk & Burke-Spero, 2005). This pattern highlights the importance of providing adequate support during the transition from preservice preparation to professional practice.

The sources of self-efficacy information identified by Bandura (1997) have been extensively studied in teacher education contexts. Mastery experiences, particularly successful teaching experiences during practicum placements, emerge as the most powerful source of efficacy development (Morris et al., 2016). Vicarious experiences, such as observing effective teaching models, also contribute significantly to efficacy development, especially in the early stages of teacher preparation. Verbal persuasion from mentors, peers, and university supervisors plays a crucial role in sustaining efficacy beliefs during challenging experiences, while managing physiological and affective states represents an important aspect of efficacy maintenance.

In the specific context of preservice teacher education development, Watson and Marschall (2019) documented the phased development of self-efficacy among mathematics preservice teachers, with efficacy in classroom management and student engagement developing earlier than efficacy in instructional strategies. This developmental sequence has important implications for designing teacher education programs that provide appropriate support at different stages of professional development. Saloviita and Almulla (2024) found significant differences in self-efficacy levels across teacher categories, with special education teachers reporting the highest efficacy levels across all dimensions. This finding suggests that teaching context and student population characteristics may influence efficacy development patterns. Leach et al. (2022) examined preservice teachers' self-efficacy during the pandemic, finding that disrupted

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professional experiences had moderate effects on self-efficacy in classroom management, instructional strategies, and student engagement. The study highlighted the importance of adaptive support systems during periods of educational disruption.

2.4. The relationship between self-efficacy beliefs and teaching behaviours

While extensive research has established the importance of self-efficacy for teacher motivation and well-being (Gong & Wang, 2023), fewer studies have directly examined the relationship between self-efficacy beliefs and observable teaching behaviours. This gap represents a significant limitation in our understanding of how psychological constructs translate into professional practice. The available evidence suggests that self-efficacy beliefs do influence teaching behaviours, but the relationship is complex and context-dependent. Teachers with higher self-efficacy are more likely to implement innovative instructional strategies, maintain positive classroom environments, and persist in the face of student challenges (Gibson & Dembo, 1984; Tschannen-Moran & Woolfolk, 2001). However, the strength of these relationships varies across teaching domains and contexts.

In the PE context, research indicates that self-efficacy beliefs influence teachers' willingness to implement new curricula, their persistence in managing challenging classes, and their effectiveness in engaging students in physical activities (Martin & Kulinna, 2003). However, most of this research has relied on self-report measures of both self-efficacy and teaching practices, limiting our understanding of how efficacy beliefs manifest in actual teaching behaviours. The current study addresses this gap by employing systematic observation of teaching behaviours alongside self-efficacy measures, allowing for direct examination of the relationship between efficacy beliefs and teaching performance. This approach provides empirical evidence about the extent to which self-efficacy beliefs predict actual teaching behaviours in real classroom settings. Based on the theoretical framework and empirical literature reviewed above, this study postulates the following hypotheses:

H1: The TSES will demonstrate adequate psychometric properties (reliability and validity) when applied to Chinese PE preservice teachers, supporting its cross-cultural applicability in this specific context.

H2: Preservice teachers' self-efficacy beliefs will be positively associated with their intention to become PE teachers, with higher efficacy beliefs predicting stronger career commitment.

H3: Self-efficacy for classroom management will significantly predict observed classroom management behaviours during student teaching, with higher efficacy beliefs associated with more effective management practices.

H4: Self-efficacy for instructional strategies will significantly predict observed instructional strategy implementation, with higher efficacy beliefs associated with more varied and effective instructional approaches.

H5: Self-efficacy for student engagement will significantly predict observed student engagement behaviours, with higher efficacy beliefs associated with more effective engagement strategies.

H6: Self-efficacy will increase significantly during the student teaching experience, with the greatest increases occurring in domains where preservice teachers receive the most targeted support and feedback.

H7: Different factors will contribute to self-efficacy development during the preservice preparation program versus the student teaching experience, reflecting the distinct challenges and opportunities of each phase.

H8: The relationship between self-efficacy beliefs and teaching behaviors will be moderated by contextual factors, including mentor support, school resources, and student characteristics.

3. Methodology

3.1. Research Design

This study employed a concurrent mixed-methods design, integrating quantitative and qualitative approaches to provide a comprehensive understanding of the self-efficacy development of preservice teachers among Chinese PE teachers. The quantitative component utilised a longitudinal survey design with multiple measurement points, while the qualitative component employed phenomenological interviews to explore participants' experiences and perceptions in depth. This mixed-methods approach allowed for triangulation of findings, with quantitative data providing generalizable patterns and qualitative data offering a rich, contextualised understanding of individual experiences.

The research design was informed by pragmatic philosophical assumptions, recognising that different methodological approaches provide complementary insights into complex educational phenomena (Creswell & Plano, 2017). By integrating multiple data sources and analytical approaches, the study aimed to develop a more nuanced understanding of self-efficacy development than could be achieved through either quantitative or qualitative methods alone.

3.2. Participants and sampling

The study involved 176 preservice teachers enrolled in the PE major at three major universities in Eastern China (See **Table 1**). Participants were recruited through purposive sampling to ensure representation across different program years and institutional contexts. The sample included 97 male participants (55.1%) and 79 female participants (44.9%), with ages ranging from 22 to 26 years (M = 24.19, SD = 1.24). The sample comprised 94 junior-year students (53.4%) and 82 senior-year students (46.6%), allowing for comparison across different stages of teacher preparation.

For the observation component, a subsample of 14 senior preservice teachers was selected based on their participation in student teaching placements during the study period. This subsample included 8 male and 6 female participants, all of whom were completing their final practicum experience. The

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interview component involved 25 participants (11 juniors and 14 seniors) selected through maximum variation sampling to ensure diversity in terms of gender, academic performance, and teaching placement characteristics.

Ethical considerations were carefully addressed throughout the research process. All participants provided informed consent after receiving detailed information about the study's purpose, procedures, and their rights as research participants. Confidentiality was maintained through the use of pseudonyms and secure data storage procedures. The study received ethical approval from the institutional review boards of all participating universities.

Characteristic	Value
Total Sample Size	176
Gender (Male)	97 (55.1%)
Gender (Female)	79 (44.9%)
Age Range	22-26 years
Mean Age	24.19 years
Juniors	94 (53.4%)
Seniors	82 (46.6%)
Observation Subset	14 senior preservice teachers
Interview Subset	25 preservice teachers (11 juniors, 14 seniors)

Table 1. Demographic characteristics of sample (N = 176).

3.3. Measures and instruments

3.3.1. Teacher self-efficacy

Teacher self-efficacy was measured using the Chinese version of the C-TSES, which has demonstrated adequate psychometric properties in previous research with Chinese teachers (Cheung, 2008). The scale comprises 24 items measuring three dimensions of teacher self-efficacy: efficacy for instructional strategies (8 items), efficacy for classroom management (8 items), and efficacy for student engagement (8 items). Participants rated their confidence on a 7-point Likert scale ranging from 1 (nothing) to 7 (a great deal). Sample items include how much you can do to control disruptive behaviour in the classroom (i.e., classroom management), how well can you implement alternative strategies in your classroom (i.e., instructional strategies), and how much can you do to motivate students who show low interest in schoolwork (i.e., student engagement).

The Chinese version of the TSES underwent additional validation procedures specific to this study, including confirmatory factor analysis to verify the three-factor structure and examination of internal consistency reliability. Preliminary analyses indicated excellent reliability across all subscales, with Cronbach's alpha coefficients of 0.92 for instructional strategies, 0.91 for classroom management, and 0.9 for student engagement.

3.3.2. Observed teaching behaviours

The teaching behaviours were systematically observed and coded using a modified version of the Academic Learning Time-Physical Education (ALT-PE) protocol, adapted to the Chinese educational context. The observation system focused on three categories of teaching behaviors corresponding to the self-efficacy dimensions: 1) classroom management behaviours, including establishing rules and routines, managing transitions, addressing disruptive behavior, and maintaining appropriate student conduct; 2) instructional strategy behaviors, including skill demonstration, providing feedback, using questioning techniques, implementing differentiated instruction, and adapting activities for diverse learners; 3) student engagement behaviours, including strategies to motivate students, promote active participation, facilitate peer interaction, and maintain student interest throughout lessons. Observations were conducted during 42 teaching sessions (three lessons per participant for the 14 observation subsample participants). Each lesson was videotaped and subsequently coded by two trained observers using a time-sampling approach with 2-minute intervals. Inter-rater reliability was established through training sessions and periodic reliability checks, achieving agreement rates of 91-96% across observation categories.

3.3.3. Career intention and commitment

Participants' intention to become PE teachers was measured using a 5-item scale adapted from previous research on teacher career commitment (Watt & Richardson, 2007). Items assessed participants' plans to enter the teaching profession, their long-term commitment to teaching, and their confidence in their teaching abilities. Responses were recorded on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

3.3.4. Achievement goals for teaching

The achievement goal questionnaire for teaching (AGQ-T) was used to assess participants' achievement orientations in teaching contexts. The 18-item scale measures six dimensions of achievement goals: task-approach, task-avoidance, self-approach, self-avoidance, other-approach, and other-avoidance (Butler, 2007). This measure provided additional context for understanding participants' motivational orientations and their relationship to self-efficacy beliefs.

3.3.5. Interview protocol

The semi-structured interviews were conducted with 25 participants to explore their experiences of self-efficacy development during teacher preparation. The interview protocol included questions about sources of teaching confidence and anxiety, experiences during coursework and practicum placements, relationships with mentors, peers, and university supervisors, perceptions of teaching challenges and successes, and career aspirations and professional identity development. Interviews were conducted in Chinese, audio-recorded with participants' permission, and subsequently transcribed verbatim for analysis.

3.4. Data collection procedures

Data collection occurred over a 12-month period, aligning with the academic calendar of participating universities. The study employed a multi-phase data collection strategy: Phase 1 (beginning of academic year): all 176 participants completed the baseline survey package, including the C-TSES, AGQ-T, and career intention measures. Demographic information was also collected at this time. Phase 2 (during coursework): participants completed the self-efficacy measures at mid-semester points to track changes during coursework phases. Phase 3 (student teaching placements): the 14 observation subsample participants were observed during their student teaching placements. Three lessons per

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participant were videotaped and coded for teaching behaviours. All participants completed self-efficacy measures at the beginning and end of their student teaching experiences. Phase 4 (post-student teaching): interview participants completed in-depth interviews about their experiences. All participants completed final self-efficacy and career intention measures. Phase 5 (follow-up): a subset of participants (n = 50) completed additional measures six months after graduation to examine longer-term patterns in self-efficacy development and career persistence.

3.5. Data analysis strategies

3.5.1. Quantitative analysis

Quantitative data were analysed using SPSS 27.0 and Mplus 8.0 software. The analysis procedures included: descriptive statistics, where means, standard deviations, and frequency distributions were calculated for all variables; psychometric analysis, which involved confirmatory factor analysis to verify the factor structure of the C-TSES and assessing internal consistency reliability using Cronbach's alpha coefficients; correlational analysis, where Pearson correlation coefficients were calculated to examine relationships between self-efficacy dimensions, teaching behaviors, achievement goals, and career intentions; regression analysis, using hierarchical regression models to examine the predictive relationships between self-efficacy beliefs and teaching behaviours, while controlling for relevant covariates; Poisson regression, which was employed to examine the relationship between self-efficacy scores and frequencies of specific teaching behaviors due to the count nature of the observed behavior data; structural equation modelling (SEM), in which a comprehensive structural model was developed to test the hypothesised relationships between self-efficacy, teaching behaviours, achievement goals, and career intentions; and longitudinal analysis, where growth curve modeling was used to examine changes in self-efficacy over time, with particular attention to the student teaching period.

3.5.2. Qualitative analysis

Interview transcripts were analysed using thematic analysis following the procedures outlined by Braun and Clarke (2006). The analysis process included: familiarization, which involved repeated reading of the transcripts to develop familiarity with the data; initial coding, where initial codes were generated to identify meaningful features of the data; theme development, which involved collating codes into potential themes and reviewing these themes in relation to the coded extracts and the entire dataset; theme refinement, where themes were refined through discussions among research team members and checked for coherence and distinctiveness; theme definition and naming, which involved developing clear definitions and names for each theme; and report production, where compelling extract examples were selected, and the analysis was related back to the research questions and existing literature. To ensure trustworthiness of the qualitative findings, several strategies were employed, including member checking (participant validation of interpretations), peer debriefing (discussion with colleagues), and maintaining an audit trail documenting analytical decisions.

3.5.3. Mixed methods integration

The integration of quantitative and qualitative findings occurred at multiple points in the analysis process. Following the recommendations of Greene et al. (1989), integration strategies included: triangulation, which involved comparing quantitative and qualitative findings to identify areas of convergence and divergence; complementarity, where qualitative findings were used to elaborate and explain quantitative results; development, using findings from one method to inform the development of the other method; initiation, where paradoxes and contradictions were discovered, leading to the reframing of research questions; and expansion, which extended the breadth and range of inquiry by using different methods for different inquiry components. Integration was facilitated through the creation of joint displays that juxtaposed quantitative and qualitative findings, allowing for direct comparison and synthesis of insights from both methodological approaches.

4. Results

4.1. Psychometric properties of measurement instruments

The initial phase of analysis focused on examining the psychometric properties of the Chinese version of the C-TSES. Internal consistency reliability was excellent across all subscales, with Cronbach's alpha coefficients of 0.92 for instructional strategies, 0.91 for classroom management, and 0.9 for student engagement. Test-retest reliability over a four-week period was also satisfactory, with intraclass correlation coefficients ranging from 0.78 to 0.85 across subscales. Confirmatory factor analysis supported the hypothesised three-factor structure, with all fit indices meeting established criteria for good model fit ($\chi^2/df = 2.34$, CFI = 0.96, TLI = 0.95, RMSEA = 0.05, SRMR = 0.04). Factor loadings ranged from 0.65 to 0.88 across items, indicating strong relationships between items and their respective latent constructs.

The AGQ-T demonstrated adequate psychometric properties after minor modifications. Following the removal of five items with poor psychometric characteristics, the modified 13-item scale showed acceptable fit indices ($\chi^2/df = 2.89$, CFI = 0.93, TLI = 0.91, RMSEA = 0.06, SRMR = 0.05) and good internal consistency across subscales ($\alpha = 0.78$-0.86).

4.2. Descriptive statistics and initial patterns

Descriptive statistics revealed that preservice teachers reported above-average levels of self-efficacy across all three domains (See **Figure 1**). Mean scores on the 7-point scale were 5.76 (SD = 0.75) for classroom management, 5.71 (SD = 0.78) for student engagement, and 5.66 (SD = 0.81) for instructional strategies. These scores indicate generally positive efficacy beliefs, though with room for improvement, particularly in the instructional strategies domain.

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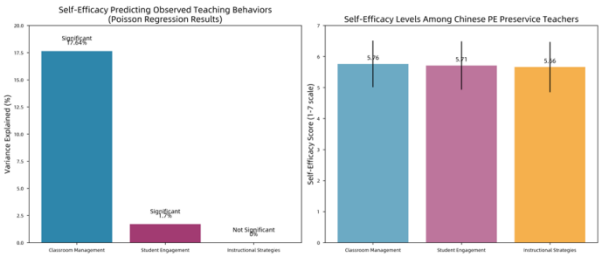


Figure 1. Self-efficacy levels results and Poisson regression results

Career intention scores were moderately high (M = 3.89, SD = 0.72 on a 5-point scale), suggesting that most participants planned to enter the teaching profession after graduation. However, variability in these scores indicated differences in commitment levels among participants.

Correlational analyses revealed several significant relationships among study variables. All three self-efficacy dimensions showed moderate to strong positive correlations with career intention ($r = 0.42$-0.58, $p < 0.001$). Achievement goal orientations demonstrated differential relationships with self-efficacy, with task-approach and self-approach goals showing positive correlations with all self-efficacy dimensions ($r = 0.31$-0.49, $p < 0.001$), while other-approach goals showed negative correlations with classroom management and student engagement efficacy ($r = -0.24$ and -0.28, $p < 0.01$).

4.3. Self-efficacy predicting observed teaching behaviours

The central analysis examined the relationship between self-efficacy beliefs and observed teaching behaviours. Poisson regression models were employed to account for the count nature of the behaviour observation data (See **Figure 1**).

The results indicated significant predictive relationships for two of the three hypothesised domains: classroom management and student engagement. Self-efficacy for classroom management significantly predicted observed classroom management behaviours ($\beta = 0.42$, SE = 0.08, $p < 0.05$), explaining 17.64% of the variance in behaviour frequencies. Participants with higher classroom management efficacy demonstrated more frequent and effective management behaviours, including clearer rule establishment, more consistent enforcement of expectations, and more proactive intervention strategies.

Similarly, self-efficacy for student engagement significantly predicted observed student engagement behaviours ($\beta = 0.18$, SE = 0.06, $p < 0.05$), explaining 1.7% of the variance. Although the effect size was smaller than for classroom management, the relationship was statistically significant, indicating that preservice teachers with higher engagement efficacy employed more strategies to motivate students and maintain participation.

However, contrary to Hypothesis 4, self-efficacy for instructional strategies did not significantly predict observed instructional strategy behaviours ($\beta = 0.09$, SE = 0.07, $p = 0.21$). This finding suggests a disconnect between preservice teachers' confidence in their instructional abilities and their actual implementation of varied instructional strategies.

Further analysis revealed that the relationship between self-efficacy and teaching behaviours was moderated by several contextual factors. Mentor support emerged as a significant moderator ($\beta = 0.31$, $p < 0.05$), with the self-efficacy-behaviour relationship being stronger for participants who received more supportive and constructive feedback from their mentor teachers. School resources also moderated the relationship ($\beta = 0.25$, $p < 0.05$), with better-resourced schools providing more opportunities for preservice teachers to implement effective teaching practices.

4.4. Longitudinal development of self-efficacy

Growth curve modelling was employed to examine changes in self-efficacy over the course of the study period, with particular attention to the student teaching experience (See **Figure 2**). Results indicated significant increases in all three self-efficacy dimensions during the student teaching period ($p < 0.05$ for all domains). The greatest increase occurred in classroom management efficacy (pre-M = 5.12, post-M = 5.89, d = 0.87), followed by student engagement efficacy (pre-M = 5.08, post-M = 5.78, d = 0.79), and instructional strategies efficacy (pre-M = 4.95, post-M = 5.55, d = 0.68).

The pattern of development differed across domains, supporting Hypothesis 6. Classroom management efficacy showed the most rapid initial increase, plateauing after approximately six weeks of student teaching. Student engagement efficacy increased more steadily throughout the placement, while instructional strategies efficacy showed the slowest and most variable development pattern.

Qualitative interview data provided rich insights into the processes underlying these developmental patterns. Participants described classroom management as their primary initial concern, with efficacy developing through successful experiences in establishing routines and managing student behaviour. As management concerns diminished, attention shifted to student engagement strategies, with efficacy developing through experimentation with different motivational approaches. Instructional strategy efficacy developed more slowly, often requiring extended practice and targeted feedback from mentors.

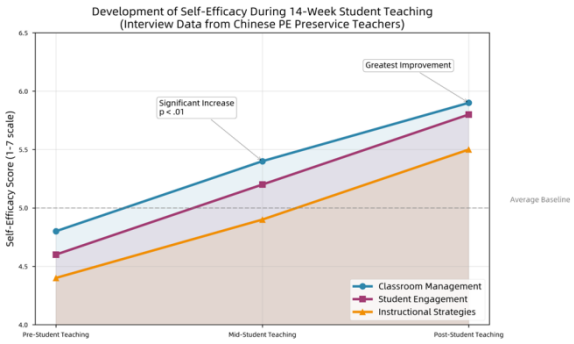


Figure 2: Development of self-efficacy during 14-week student teaching (interview data)

4.5. Factors contributing to self-efficacy development

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Analysis of interview data identified several key factors that contributed to self-efficacy development during different phases of teacher preparation (See **Figure 3**). During the PE major, professors' support (85%) was highlighted, with participants emphasising the importance of supportive relationships with university professors who provided both academic guidance and emotional support. Extracurricular activities (65%), such as involvement in coaching, sports clubs, and community programs, were also mentioned as valuable practical experiences that enhanced teaching confidence. Content-knowledge courses (70%), including courses in sports science, exercise physiology, and coaching methods, were identified as crucial for developing subject-specific confidence.

During student teaching, mentor teachers (90%) emerged as the most significant factor, with effective mentors providing modelling, feedback, and emotional support. Varied experiences (80%), such as teaching different grade levels, ability groups, and activity types, contributed to broader efficacy development. Constructive feedback (85%) from mentors and university supervisors helped preservice teachers refine their practices and build confidence. Participants described a developmental progression in which different factors became important at different stages. Early in the program, academic support and content knowledge were the primary concerns, while during student teaching, practical experiences and mentoring relationships took precedence. After graduation, ongoing professional development and collegial support were recognised as essential for sustaining efficacy beliefs.

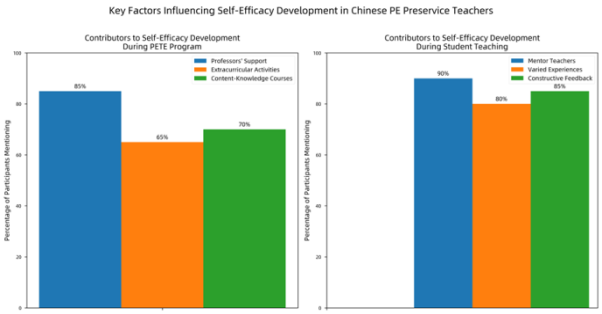


Figure 3: Key factors influencing self-efficacy development

4.6. Self-efficacy and career intentions

SEM examined the relationship between self-efficacy beliefs and career intentions. The model demonstrated good fit (χ^2/df = 2.12, CFI = 0.97, TLI = 0.96, RMSEA = 0.04, SRMR = 0.03) and revealed several significant pathways. All three self-efficacy dimensions significantly predicted intention to become a PE teacher (β = 0.38 for classroom management, 0.31 for student engagement, 0.29 for instructional strategies, all $p < 0.05$). These relationships remained significant after controlling for achievement goals, demographic variables, and prior teaching experience.

Achievement goal orientations showed differential relationships with career intentions. Self-approach goals (focusing on personal improvement) positively predicted career intention (β = 0.24, $p < 0.05$), while other-avoidance goals (avoiding negative evaluations from others) showed a negative relationship (β = -0.19, $p < 0.05$). Task-oriented goals did not show significant direct effects on career intentions but influenced intentions indirectly through their effects on self-efficacy.

Overall, the model explained 52% of the variance in career intentions, indicating that self-efficacy beliefs and achievement goals together account for a substantial portion of preservice teachers' professional commitment.

4.7. Qualitative themes: The experience of efficacy development

Thematic analysis of interview transcripts revealed four overarching themes related to self-efficacy development. The first theme, the journey from anxiety to confidence, described participants' initial teaching experiences as anxiety-provoking, particularly concerning classroom management. Over time, through repeated practice and supportive feedback, their anxiety gradually transformed into confidence, although this process was nonlinear and included setbacks. The second theme, the central role of relationships, emphasised the importance of supportive relationships with mentors, peers, and university supervisors in efficacy development. Effective mentors provided both technical guidance and emotional support, offering encouragement during challenging moments. The third theme, learning through doing, highlighted the significance of practical teaching experiences for building confidence. While coursework provided the theoretical foundation, actual teaching experiences allowed preservice teachers to test strategies, receive feedback, and refine their practices. The final theme, navigating contextual challenges, described the various contextual factors, such as school resources, administrative support, student characteristics, and cultural expectations, that influenced efficacy development. Adapting teaching practices to different contexts was identified as a crucial aspect of professional growth. These themes underscore the complex and multifaceted nature of self-efficacy development, encompassing cognitive, emotional, social, and contextual dimensions.

4.8. Integration of quantitative and qualitative findings

The integration of quantitative and qualitative findings revealed several areas of convergence and complementarity. Convergence: both quantitative and qualitative data indicated that self-efficacy increases during student teaching, with classroom management showing the most rapid development. Both approaches also identified mentor support as a crucial factor in efficacy development. Complementarity: quantitative data provided precise estimates of effect sizes and developmental trajectories, while qualitative data offered rich descriptions of the experiences and processes underlying these patterns.

Furthermore, qualitative findings expanded upon quantitative results by identifying specific mechanisms through which different factors influence efficacy development. For example, while quantitative analysis showed that mentor support moderated the self-efficacy-behaviour relationship, qualitative data revealed how mentors provide specific types of feedback and emotional support that contribute to efficacy

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development. In addition, the contradictions between quantitative and qualitative findings prompted reconsideration of certain assumptions. For instance, the quantitative finding that instructional strategy efficacy did not predict observed behaviours contrasted with participants' qualitative reports of growing confidence in this domain. This contradiction led to a deeper investigation of potential measurement issues and contextual factors that might explain the discrepancy.

5. Discussion

5.1. Key findings

The findings of this study provide significant insights into the complex relationship between teacher self-efficacy and observed teaching behaviours among Chinese PE preservice teachers. The central finding revealed that self-efficacy beliefs predicted teaching behaviours in two of three domains (i.e., classroom management and student engagement), which offers empirical support for Bandura's (1997) theoretical proposition that efficacy beliefs influence performance. This represents an important contribution to the literature, as previous research has primarily relied on self-report measures of both self-efficacy and teaching practices, limiting understanding of how psychological constructs translate into actual classroom behaviours.

The differential predictive power across domains warrants particular attention. The strong relationship between classroom management efficacy and observed management behaviours (explaining 17.64% of variance) aligns with previous research suggesting that management represents a primary concern for beginning teachers (Woolfolk & Burke-Spero, 2005). The immediate, tangible nature of management challenges may make efficacy beliefs in this domain particularly salient and influential on practice. In contrast, the weaker relationship for student engagement efficacy (explaining 1.7% of variance) suggests that other factors, such as school culture, student characteristics, or curriculum constraints, may play larger roles in determining engagement strategies.

The non-significant relationship between instructional strategy efficacy and observed behaviours represents a particularly intriguing finding. Several potential explanations merit consideration. First, preservice teachers may overestimate their instructional capabilities due to limited practical experience, creating a disconnect between perceived and actual competence. Second, contextual constraints, such as rigid curricula, limited resources, or administrative pressures, may prevent even highly efficacious teachers from implementing varied instructional strategies. Third, measurement issues may contribute to this finding, as the observation protocol may not have captured subtle aspects of instructional quality that efficacy beliefs influence.

The longitudinal development patterns observed in this study align with Watson and Marschall's (2019) phased development model, with classroom management efficacy developing most rapidly, followed by student engagement efficacy, and finally instructional strategy efficacy. This pattern suggests that efficacy development follows a logical progression, with teachers first addressing fundamental management concerns before focusing on engagement and instructional quality. The slower development of instructional strategy efficacy may reflect the complexity of this domain, requiring deeper content knowledge, pedagogical expertise, and adaptive teaching skills.

5.2. Theoretical implications

The findings of this study have several important implications for self-efficacy theory and its application to teacher education. First, the domain-specific nature of the relationships between efficacy beliefs and teaching behaviours supports the importance of examining self-efficacy at the domain level rather than as a global construct. This aligns with Bandura's (1997) contention that self-efficacy is context-specific and varies across domains of functioning.

Second, the moderating effects of contextual factors, particularly mentor support and school resources, highlight the importance of considering self-efficacy within its ecological context. This supports ecological systems approaches to understanding teacher development (Bronfenbrenner, 1979), which emphasise the interaction between individual characteristics and environmental factors.
Third, the reciprocal relationship between self-efficacy and teaching performance suggested by the longitudinal data supports Bandura's (1997) concept of reciprocal determinism, in which personal factors, behaviours, and environmental influences interact bidirectionally. Successful teaching experiences enhance efficacy beliefs, which in turn influence future teaching practices, creating a positive developmental cycle.

Last, the integration of self-efficacy theory with achievement goal theory provides a more comprehensive understanding of teacher motivation. The differential relationships between various achievement goal orientations and self-efficacy dimensions suggest that teachers' reasons for engaging in teaching activities influence their confidence development in specific domains.

5.3. Practical implications

The findings offer several concrete recommendations for improving PE preservice teacher education programs in China. First, teacher education programs should provide targeted support for domain-specific development, addressing the distinct developmental patterns observed across efficacy domains. Early emphasis should be placed on classroom management strategies, with a gradual introduction of student engagement techniques and instructional innovations. Second, given the crucial role of mentor support identified in this study, programs should invest in comprehensive mentor training and support systems. Effective mentors should receive training in providing specific, constructive feedback and emotional support tailored to preservice teachers' developmental needs.

Furthermore, to address the disconnect between instructional strategy efficacy and observed behaviours, there is a need for better integration of theory and practice. Microteaching

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opportunities, video analysis, and guided reflection can help bridge this gap. Fourth, preservice teachers need preparation for adapting their teaching practices to diverse school contexts, especially given China's significant urban-rural disparities in educational resources. Field experiences in varied settings can enhance contextual adaptability. Fifth, given the relationship between self-efficacy and career intentions, teacher education programs should implement career support systems, including career counselling, to help preservice teachers navigate the transition to professional practice and sustain their commitment to teaching. Last, comprehensive assessment and feedback systems should track efficacy development across domains, providing targeted feedback based on both self-report measures and observational data to capture different aspects of teaching development.

5.4. Limitations and future research directions

Several limitations of the current study should be acknowledged. First, the sample, while substantial, was drawn from universities in Eastern China, potentially limiting generalizability to other regions. Future research should include more diverse geographical representation. Second, the observation component involved a relatively small subsample (n = 14), limiting statistical power for some analyses. Larger-scale observational studies would strengthen confidence in the findings. Third, the study focused primarily on the student teaching period, with limited follow-up into participants' early career years. Longitudinal research tracking efficacy development across the entire career trajectory would provide valuable insights. Fourth, while the study examined several contextual antecedents, other potentially important factors, such as school leadership, collegial relationships, and parental involvement, were not systematically investigated. Future research should adopt more comprehensive ecological frameworks. Fifth, the study relied primarily on quantitative measures of self-efficacy, which may not capture all dimensions of teaching confidence. Mixed-methods approaches incorporating more nuanced qualitative assessments could provide a richer understanding.

Future research should address several key questions emerging from this study. First, the mechanisms of efficacy-behaviour relationships need to be explored, specifically examining what cognitive, affective, and behavioural processes mediate the relationship between efficacy beliefs and teaching practices. Second, the cultural specificity of the findings should be considered, such as how much of the observed patterns are specific to Chinese educational contexts, and how they compare with other cultural settings. Third, long-term development should be investigated by exploring how efficacy beliefs evolve across different career stages and what factors influence the long-term maintenance or decline of efficacy. Additionally, the effectiveness of various interventions, such as mentoring approaches, feedback strategies, and professional development models, should be examined to determine which most effectively enhance teacher self-efficacy. Lastly, future research should explore how teacher efficacy beliefs ultimately influence student learning outcomes, particularly in the context of physical education.

5.5. Conclusion

This comprehensive study provides empirical evidence supporting the relationship between teacher self-efficacy beliefs and observed teaching behaviours among Chinese PE preservice teachers. The findings demonstrate that efficacy beliefs significantly predict teaching performance in classroom management and student engagement domains, though not in instructional strategies. The study reveals distinct developmental patterns across efficacy domains and identifies key factors, particularly mentor support, that influence efficacy development. The research contributes to both the theoretical understanding of teacher self-efficacy and practical approaches to teacher education. By elucidating the complex relationships between psychological constructs and teaching practices, the study offers guidance for designing more effective teacher preparation programs. In the context of China's ambitious educational reforms emphasising PE integration, these insights have particular relevance for developing the high-quality teaching force needed to achieve national educational goals. Ultimately, this study underscores the importance of attending to teachers' psychological development alongside their technical preparation. By fostering strong self-efficacy beliefs through targeted support, meaningful experiences, and constructive feedback, teacher education programs can enhance not only preservice teachers' confidence but also their teaching effectiveness and professional commitment.

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