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The interplay of self-efficacy, grit, and metacognition in shaping work engagement among EFL teachers: a comparative study of Mainland China and Hong Kong

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Abstract

This study investigates the relationships among teacher self-efficacy, grit, metacognition, and work engagement among secondary school English as a Foreign Language (EFL) teachers in mainland China and Hong Kong. Utilizing a purposive sampling method, 592 teachers from diverse educational settings participated in the study. Structural Equation Modeling (SEM) was employed to analyze the data, revealing that both self-efficacy and grit significantly predict work engagement, with teaching metacognition serving as a mediator in these relationships. Notably, the impact of self-efficacy on work engagement was stronger in Hong Kong, while grit exhibited a more pronounced indirect effect through metacognition in the same region. These findings underscore the importance of fostering self-efficacy and grit, alongside enhancing metacognitive practices, to bolster teacher engagement. The study highlights cultural and systemic factors that influence these dynamics, providing insights for developing targeted professional development programs and supportive educational policies tailored to different cultural contexts.

Keywords Teacher self-efficacy, Grit, Metacognition, Work engagement, EFL teachers, Mainland China, Hong Kong, Structural equation modeling, Educational psychology

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Introduction

Psychological constructs such as self-efficacy, grit, work engagement, and metacognition significantly impact teacher effectiveness and student success. Teacher self-efficacy, defined as teachers' belief in their ability to positively influence student learning [1, 2], is essential as it promotes innovative methods, resilience in facing classroom challenges, and supportive learning environments [3]. This belief is particularly pertinent in Chinese EFL contexts, where teachers balance high academic expectations with traditional and modern pedagogies. Guan and Blair [4] highlight that China's hierarchical education

system can either enhance or diminish self-efficacy, depending on available administrative support and professional development opportunities. In Mainland China, EFL teachers frequently experience intense pressure preparing students for the *Gaokao*, a high-stakes national college entrance examination, often prioritizing rote memorization over communicative language approaches and potentially undermining their confidence in adopting student-centered methodologies [4].

Grit, described as perseverance and passion for long-term goals [5], is equally important in educational settings, requiring teachers to adapt persistently to foster student achievement [6, 7]. In Chinese EFL classrooms, grit enables teachers to address challenges including large class sizes, diverse student needs, and rigorous testing demands. For example, Mainland Chinese EFL teachers frequently manage overcrowded classrooms, complicating individualized attention and necessitating sustained effort to maintain engaging lessons. In Hong Kong, ongoing educational reforms further complicate teaching, as teachers continually adjust to evolving curricula and standards, emphasizing perseverance as critical to navigating these demands [8]. Specifically, the implementation of Hong Kong's New Senior Secondary (NSS) curriculum has compelled teachers to redesign lesson plans and adapt assessment strategies, significantly increasing their workloads [9].

Work engagement, defined as vigor, dedication, and absorption in teaching [10], sustains teacher enthusiasm, motivation, and effectiveness, all of which shape educational outcomes [11]. In Chinese EFL contexts, engagement reflects both intrinsic motivation and external pressures. In Mainland China, emphasis on standardized testing and national curriculum guidelines may lead teachers to favor exam drills over interactive language activities, potentially dampening engagement for those who prefer dynamic methods [4]. In contrast, Hong Kong's multilingual environment demands that teachers navigate between English and Cantonese to meet diverse student needs, a cognitively and emotionally demanding task requiring sustained energy and commitment [12].

Teacher metacognition, which involves awareness and regulation of instructional practices [13], enables teachers to critically assess and adapt methods based on student feedback, promoting professional growth [13, 14]. This role is especially vital in EFL contexts, where teachers must adjust strategies to address students' diverse linguistic and cultural needs. In Hong Kong, evolving educational policies have further required teachers to develop advanced metacognitive skills to navigate bilingual education and classroom diversity [8]. For example, an EFL teacher in Hong Kong might metacognitively monitor their use of code-switching during instruction, reflecting on its effectiveness for student comprehension and adjusting their strategy accordingly to optimize learning for students with varying language backgrounds [13].

Despite extensive research on self-efficacy, grit, and work engagement, little is known about their specific interactions within Chinese EFL contexts, where distinct cultural factors shape teaching practices. Much existing literature has examined Western contexts, where values such as individualism and self-reliance predominate [15, 16]. However, both mainland China and Hong Kong are strongly influenced by Confucian values, which emphasize harmony, respect for authority, and the importance of education in society [18–20]. While these cultural foundations are shared, differences arise due to each region's historical and socio-political contexts, which create distinct educational landscapes.

In mainland China, the education system emphasizes collective achievement and social harmony, which can affect teachers' self-efficacy and instructional choices due to the pressure to adhere to national standards [4]. This approach reflects Confucian values such as respect for authority and group cohesion, guiding teachers toward practices that prioritize collective success over individual initiatives. For instance, Mainland Chinese EFL teachers may stick closely to set textbooks and lesson plans to meet expectations, limiting their freedom to try new ideas. In contrast, Hong Kong's educational system, shaped by a blend of Confucian and Western influences due to its colonial history, integrates traditional and modern pedagogies. This context allows teachers greater autonomy, often encouraging critical thinking and individualized attention to students [12, 21]. In Hong Kong, teachers might design their own projects or assessments, reflecting a system that trusts their professional judgment. While Hong Kong's education still embodies Confucian principles, it simultaneously supports teacher autonomy and personal agency in ways that empower teachers to make independent instructional choices, fostering engagement connected to personal competence.

Understanding these cultural and systemic influences on teacher psychology is crucial. Cross-cultural studies [22] indicate that values like collectivism versus individualism shape educational dynamics, likely affecting teacher engagement differently in Mainland China compared to Hong Kong. This understanding has direct practical implications for policy (regarding teacher autonomy vs. structural support) and targeted teacher training (e.g., fostering efficacy within constraints in Mainland China, emphasizing metacognitive strategies in Hong Kong) [23–25].

Addressing both shared cultural foundations and regional distinctions is key to situating teacher engagement authentically in each EFL context. This study addresses a significant gap by examining the roles of

self-efficacy, grit, work engagement, and metacognition among EFL teachers in mainland China and Hong Kong, aiming to inform culturally responsive policies that support teacher effectiveness and well-being across diverse educational landscapes.

Literature review
Theoretical framework
This study is grounded in Social Cognitive Theory (SCT) [26, 27], which describes reciprocal determinism—where personal factors (e.g., beliefs), behaviors, and environments interact to shape functioning. Central to SCT is self-efficacy, the belief in one's ability to achieve desired outcomes [26]. Bandura [26] identified self-efficacy sources like mastery experiences, vicarious experiences, social persuasion, and physiological states. Teacher self-efficacy, influenced by these sources, shapes instructional choices, innovation, persistence, and effective learning environments, impacting student outcomes [1–3].

SCT explicitly theorizes how self-efficacy influences behavior: stronger efficacy beliefs lead individuals to set more challenging goals, expend greater effort, and persist longer when encountering difficulties [26]. This theoretical mechanism directly informs the link between self-efficacy and grit (perseverance and passion for long-term goals [5]); teachers who believe in their capabilities are theoretically more likely to demonstrate the sustained effort characteristic of grit, especially when managing challenges like language barriers, large classes, or high-stakes assessments [6, 7, 28–31]. Furthermore, SCT emphasizes human agency through cognitive processes, particularly self-regulation [27]. Teacher metacognition—awareness and regulation of instructional practice [13]—represents a key self-regulatory capability. Within SCT, metacognitive processes allow teachers to monitor their performance, reflect on outcomes (interpreting mastery or vicarious experiences), adjust strategies, and proactively shape their environment. This self-regulatory activity not only enhances teaching effectiveness but also modifies self-efficacy beliefs through the successful navigation of experiences [27, 32–35].

Environment and strategies also influence self-efficacy. Lo [36] found that hybrid learning designs with supportive strategies boost student self-efficacy and achievement by fostering mastery experiences [26]. Similarly, teachers using effective strategies, supported by metacognition [13], maintain self-efficacy and motivation in challenging contexts like technology integration [36, 37].

This study examines self-efficacy and grit conjointly, recognizing their complementary roles in teacher motivation and persistence [15, 38]. The primary outcome variable is work engagement, characterized by vigor, dedication, and absorption [10, 39]. Drawing on SCT, we conceptualize work engagement as arising from this dynamic interplay: teachers' engagement levels are influenced by their self-efficacy beliefs and grit-related persistence [11, 40–44], with metacognitive self-regulation playing a mediating role in how effectively they translate beliefs and perseverance into engaged practice [14, 35, 45]. This framework thus integrates self-efficacy, grit, and metacognition within SCT to understand the dynamics underpinning EFL teacher work engagement.

The importance and challenges of teacher work engagement
Teacher work engagement, characterized by vigor, dedication, and absorption [39], is vital for educational success. Engaged teachers bring enthusiasm and resilience, enhancing student achievement through effective learning environments, reducing burnout, and fostering collaborative school climates [7, 10, 39, 40, 46, 47]. However, sustaining engagement is challenging due to heavy workloads, limited resources, and scarce professional growth opportunities, which increase stress [48]. School cultures lacking trust and collaboration can further promote disengagement [45, 49].

In EFL contexts, engagement is critical, requiring enthusiasm and resilience to meet diverse linguistic and cultural needs [50, 51]. Engaged EFL teachers improve student language proficiency, prevent burnout, and create supportive school atmospheres [52, 53]. Yet, they face unique challenges like heavy workloads, limited resources, and language proficiency expectations, which heighten stress [54, 55], alongside the complexity of adapting to diverse student needs [56, 57]. Engagement in EFL settings is shaped by self-efficacy, grit, metacognition, and emotional well-being. High self-efficacy boosts engagement by fostering confidence in teaching practices, encouraging reflection and motivation [58]. It also predicts engagement alongside teaching enjoyment and well-being [41, 59]. Grit, marked by sustained passion and perseverance, helps teachers overcome language instruction challenges, supporting engagement despite incremental progress [40, 60].

Emotion regulation and reflective practices also play crucial roles in supporting engagement, acting as mediating factors between self-efficacy and engagement. Effective emotion regulation strategies enable EFL teachers to manage stress and maintain resilience, while regular reflective practices help them adapt and evolve their teaching approaches [61]. Supportive school climates, which foster collaboration and teaching enthusiasm, are equally important in sustaining engagement and creativity, ultimately enhancing both teacher satisfaction and instructional quality [56, 57].

Overall, engagement in EFL settings is shaped by self-efficacy, grit, emotional factors, and school environment,

highlighting the need for culturally responsive strategies to enhance teachers' professional experience.

The link between teacher metacognition and work engagement in EFL contexts

Metacognition, the ability to "think about thinking" [62], is vital for effective teaching in EFL settings, where teachers navigate linguistic and cultural challenges [63]. It involves planning, monitoring, and evaluating instruction [32, 33], enabling teachers to adapt strategies to diverse student needs. Strong metacognitive skills improve student outcomes and enhance teacher self-efficacy [14, 34]. Zhang and Zhang [63] note that metacognition helps teachers foster self-regulated learning, promoting student autonomy, which is particularly valuable in EFL contexts.

However, opportunities to develop metacognitive skills are often limited in EFL settings due to constrained resources [34]. Perry et al. [34] highlight that professional development frequently neglects metacognitive training, leaving teachers ill-equipped to reflect and improve. Addressing this gap requires integrating metacognitive skill-building into training programs. Research links metacognition to work engagement, showing that teachers using metacognitive strategies are more innovative and engaged with diverse learners [64]. Santisi et al. [35] find a positive link between metacognition and work motivation, while Greenier et al. [65] show that metacognition and enthusiasm predict teaching creativity, enhancing engagement in EFL classrooms with varied language proficiency and cultural diversity.

Metacognitive reflection enhances teachers' resilience and adaptability in EFL contexts. Heng and Chu [66] found it predicts resilience and work engagement, helping teachers manage linguistic and cultural challenges while sustaining motivation. Beyond K-12, Namaziandost et al. [67] showed reflective teaching and emotion regulation boost engagement in higher education, a finding supported by Weisi and Salari [68], who noted mindfulness-enhanced reflection aids professional growth and strengthens metacognition's link to engagement.

The capacity for teachers to adjust their instructional methods is critical in EFL contexts where diverse linguistic backgrounds demand flexible approaches. Metacognitive skills enable teachers to assess and adjust their teaching strategies, enhancing both student outcomes and teacher satisfaction [63, 64]. By developing metacognitive abilities, educators not only improve instructional quality but also cultivate a growth mindset that encourages continuous professional development [33]. Teachers who engage in such reflective practices are more likely to adopt new methodologies and technologies, maintaining their effectiveness and adaptability in a rapidly changing educational landscape.

While the benefits of metacognition for teaching and work engagement are well-established, further investigation is necessary to fully understand the specific relationship between these constructs in EFL settings. Existing studies suggest a positive link between metacognitive strategies and teacher motivation [35, 65, 66], but more detailed research is needed to clarify the mechanisms at work. For instance, exploring how different aspects of metacognition—such as planning versus evaluation—uniquely contribute to work engagement could provide valuable insights.

Overall, metacognition is key to effective teaching, student success, and engagement in EFL contexts, enabling teachers to adapt and stay motivated. This study examines these relationships among Chinese EFL teachers to inform professional development focused on metacognitive skills, aiming to enhance engagement and classroom outcomes.

The role of grit in shaping teacher practices and engagement

Grit, defined as perseverance of effort and consistency of interest toward long-term goals [5, 6, 30], is recognized as a crucial predictor of success in education, influencing teachers' instructional practices and professional resilience. In teaching, grit involves maintaining commitment to student success, adapting instructional approaches, and overcoming setbacks [28, 31]. Teachers demonstrating higher levels of grit are often more likely to implement innovative methods and responsively tailor strategies to diverse student needs [28, 29, 69]. This capacity enables educators to persist effectively through challenges such as complex student needs, rigorous curriculum demands, and evolving educational landscapes, thereby fostering the sustained motivation and dedication essential for work engagement [38, 40, 44]. Grit may also indirectly bolster engagement by contributing to positive professional attitudes [7] and enhancing the resilience required to manage occupational demands [38]. This sustained effort and adaptability are particularly critical in the demanding teaching profession.

In the context of EFL instruction, grit plays a critical role in managing unique demands such as diverse student needs, classroom management difficulties, and varying institutional support. Teachers demonstrating high levels of grit are better equipped to withstand job-related stressors inherent in these demanding environments, enabling them to maintain engagement over time [54]. This capacity for resilient persistence contributes significantly to sustained engagement, particularly within challenging teaching contexts like EFL [70]. Furthermore, grit is associated with enhanced self-regulation [71], a crucial factor for developing professional agency and resilience which underpins effective teaching practice.

The rationale for proposing metacognition as a mediator between grit and engagement lies in the nature of gritty perseverance. Achieving long-term goals in teaching requires not only sustained effort but also adaptive regulation of that effort [5, 31]. Grit is linked to enhanced self-regulation [71], which involves metacognitive processes like monitoring progress, evaluating strategies, and adjusting actions [13, 14]. Thus, gritty teachers, committed to overcoming challenges and achieving student success [28], are likely to use reflective thinking to ensure their efforts are effective. Although direct studies on the grit-to-metacognition pathway in teachers are limited, this self-regulatory link [71] supports the hypothesis that metacognition mediates grit's effect on engagement.

Supportive environments also foster grit and engagement in EFL teachers. Peer and institutional support enhance resilience and commitment, with grit and teaching enjoyment as mediators [56]. In summary, grit promotes resilience and sustained engagement, aiding EFL teachers' effectiveness and supporting their professional growth through targeted development.

Self-efficacy as a foundation for work engagement in EFL contexts

Teacher self-efficacy—the belief in one's ability to impact student learning—greatly enhances work engagement in EFL contexts [2, 15]. It shapes teaching by improving student engagement, instructional strategies, and classroom management [2]. Confident teachers with high self-efficacy often adopt innovative pedagogies, fostering dynamic learning environments [15, 72]. This confidence improves classroom climate and motivates students to set ambitious goals and persist, yielding better outcomes across academic levels [1, 73].

Self-efficacy also extends to collective efficacy within schools. Supportive cultures with positive interactions and strong collective efficacy boost individual teacher engagement and collaboration [16, 74]. These environments allow teachers to build self-efficacy through shared experiences and support, creating a thriving educational climate [16, 75]. Thus, fostering collegial school cultures is key to supporting self-efficacy and enhancing engagement among EFL educators.

Research consistently shows a positive association between teacher self-efficacy and work engagement, indicating that teachers who believe in their capabilities are more likely to exhibit higher motivation, commitment, and enthusiasm in their roles [16, 49, 74–78] although this relationship can be complex, potentially mediated by factors such as teacher anxiety, especially in contexts like online teaching [79]. Some studies suggest a reciprocal relationship where work engagement can, in turn, bolster self-efficacy over time [76]. Factors such as personality traits and school culture may moderate this relationship,

pointing to a complex interplay between individual attributes and environmental influences [16, 45].

In Chinese EFL contexts, self-efficacy is key to managing challenging settings [80]. Teachers with high self-efficacy better handle stress, avoid burnout, and sustain engagement, supported by resilience [81, 82]. Grit further boosts engagement by enhancing commitment and perseverance [40]. Thus, self-efficacy, alongside resilience and grit, strengthens engagement among EFL teachers. Self-efficacy also promotes metacognitive teaching practices. Confident teachers are more likely to reflect, monitor, and adapt their methods based on student feedback [83]. Supportive environments fostering metacognitive skills and creativity can enhance self-efficacy, improving instructional quality [84]. This makes self-efficacy essential for effective teaching and a reflective mindset adaptable to educational challenges.

Additionally, self-efficacy interacts with other factors to foster a motivated teaching workforce. In Chinese EFL contexts, high self-efficacy correlates with greater engagement and self-reflection, boosting effectiveness [41, 58]. It also predicts engagement alongside psychological well-being and teaching enjoyment, underlining its role in job satisfaction and motivation [40, 53, 59]. The role of enjoyment in language learning motivation is well-documented [85, 86], and Lo [87] notes that positive emotions like enjoyment in Hong Kong settings can enhance student self-efficacy and performance, suggesting similar benefits for teacher engagement. Specifically, positive affective experiences like teaching enjoyment may enhance teacher motivation and engagement by making demanding instructional tasks feel more sustainable and intrinsically rewarding, potentially fostering stronger teacher-student rapport and contributing to a positive upward spiral of effective practice and professional satisfaction [87, 88, 89].

Moreover, Effective emotion regulation can enhance self-efficacy's positive effect on engagement by reducing burnout [61]. Grit serves as a mediator between self-efficacy and engagement, demonstrating that perseverance enhances the beneficial effects of self-efficacy [44, 69]. Attributes like academic buoyancy—the ability to handle academic challenges—also play a role [60], and buoyancy itself can mediate the self-efficacy to engagement link in online EFL teaching [77], underscoring the multi-dimensional nature of self-efficacy in fostering professional resilience.

In summary, self-efficacy is crucial for fostering engagement among Chinese EFL teachers, interacting with grit, enjoyment, and emotion regulation to build a resilient workforce. Educational institutions should promote self-efficacy through professional development and supportive environments to enhance teacher effectiveness.

Rationale and hypotheses

This study is grounded in Social Cognitive Theory (SCT) [27], which highlights self-efficacy—beliefs in one's capabilities—as a driver of motivation and achievement. In education, teacher self-efficacy is linked to work engagement and job satisfaction [3, 11]. However, few studies have examined these links in EFL teaching, especially in culturally distinct regions like Mainland China and Hong Kong. This study explores how self-efficacy, grit, and metacognition shape EFL teacher engagement in these contexts, addressing the unique challenges they face.

Grit, associated with resilience and sustained commitment [30, 31], is vital for EFL teachers facing pressures like standardized curricula in China and diverse student expectations in Hong Kong. It fosters engagement by supporting resilience and dedication amid challenges. The study also includes teacher metacognition—the ability to monitor and regulate instructional processes [20]. Metacognitive skills, such as planning and evaluating strategies, enhance teaching effectiveness and student outcomes [34], while reflective practices boost work motivation [35]. Based on the theoretical link between gritty perseverance and the self-regulatory processes inherent in metacognition [71], we hypothesize a pathway where grit influences engagement partly through enhanced metacognitive practice (H4).

This study's cross-regional approach compares EFL teachers in Mainland China and Hong Kong, which share Confucian values but differ in socio-political and educational systems. China's collectivist, centralized system with a focus on standardized testing contrasts with Hong Kong's individualistic, Western-influenced framework, which prioritizes teacher autonomy and critical thinking. These differences, as seen in Lo's [22] analysis of student motivation, provide a framework to explore how self-efficacy, grit, metacognition, and engagement vary across contexts. In China, Confucian norms emphasizing hierarchy and harmony may limit teachers' reflection, potentially hindering metacognitive growth, self-efficacy, and grit.

Through this comparative perspective, the study aims to address specific gaps in the literature by illustrating how cultural and institutional factors shape the dynamics of self-efficacy, grit, and metacognition among EFL teachers. By examining these relationships in two distinct educational contexts, the study extends beyond a single cultural lens, highlighting the importance of culturally adaptive strategies for enhancing teacher engagement. Additionally, by assessing the potential moderating effects of cultural dimensions on these variables, the study seeks to offer targeted insights for policies that cater to the unique needs and values of EFL teachers in each region. Findings from this research are intended to inform culturally responsive educational policies that support EFL teacher engagement and well-being across diverse settings. To visually represent the proposed relationships, Fig. 1 illustrates the hypothetical model.
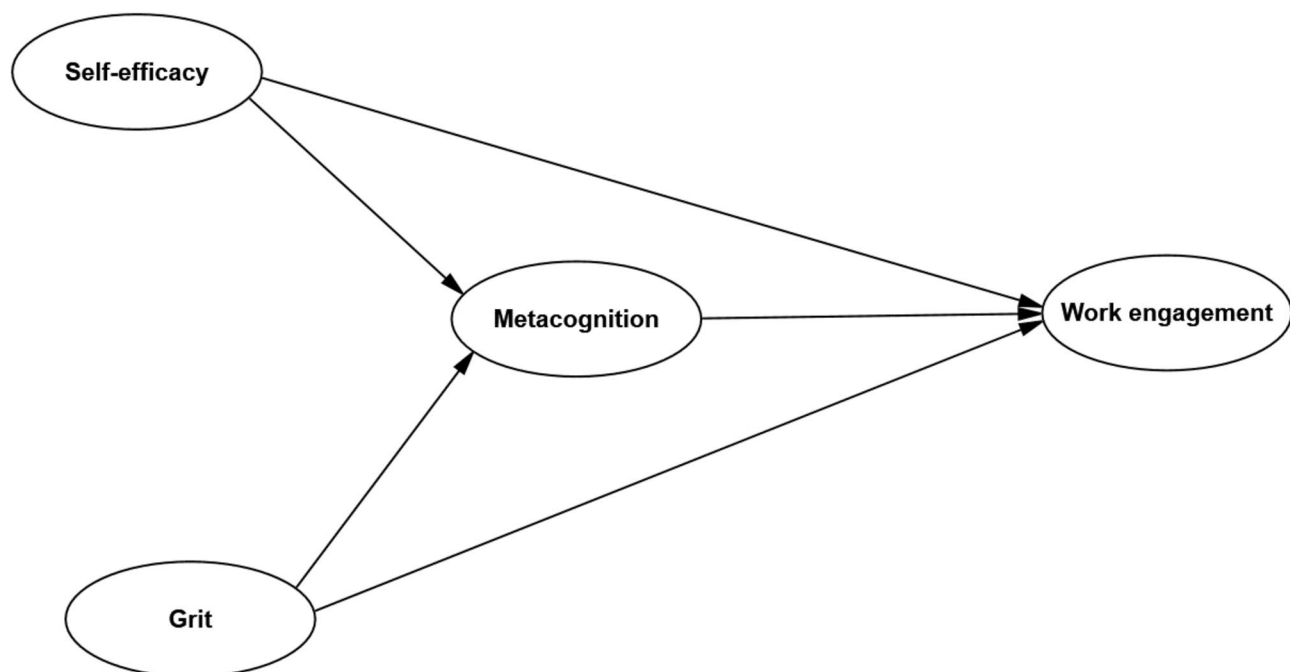
Hypotheses.

Fig. 1 Proposed structural model of work engagement in EFL teachers

1. **H1**: Teacher self-efficacy is positively related to work engagement.
2. **H2**: Teacher grit is positively related to work engagement.
3. **H3**: Teacher metacognition mediates the relationship between teacher self-efficacy and work engagement.
4. **H4**: Teacher metacognition mediates the relationship between teacher grit and work engagement.

Methods

Subjects

This study employed purposive sampling to select 592 secondary school EFL teachers from 24 public and private schools across mainland China and Hong Kong. Participants were chosen to capture diverse perspectives relevant to the study's objectives, with careful selection criteria ensuring representation across urban and suburban schools. The sample included 306 teachers from 14 schools in mainland China and 286 teachers from 10 schools in Hong Kong, representing various regions and school environments.

To ensure comprehensive representation, school selection was based on geographic location (urban versus suburban), school type (public versus private), and availability of educational resources (e.g., language labs, technology-enhanced learning tools). This approach allowed for insights from a range of educational contexts, from well-resourced schools to those with more limited resources, as well as schools offering international or bilingual programs in Hong Kong. These varied contexts facilitated an exploration of the distinct challenges and experiences across different stages of language instruction. The selected schools also represented a range of student demographics and socioeconomic backgrounds. Urban schools, especially in mainland China, typically had larger class sizes due to higher population density, whereas suburban schools offered smaller, more individualized class settings. This variation provided a robust basis for examining how contextual factors shape teacher engagement and instructional practices.

The participant pool consisted of 337 female and 255 male teachers, aged 25 to 55 years, with an average age of 37. Teaching experience ranged from 3 to 25 years, averaging 11 years, thereby capturing insights across career stages, from early-career to experienced educators. Academically, 28% held a master's degree in English or a related field, while 72% held a bachelor's degree, ensuring a substantial educational background across the sample. Participants taught across secondary grade levels, covering a range of student developmental stages and language proficiencies, thereby enhancing the relevance of findings to different levels of language acquisition.

To align with the study's objectives, inclusion criteria required participants to be currently employed EFL teachers in secondary schools, with a minimum of three years of teaching experience to ensure responses grounded in practical experience. A bachelor's degree in English or a related field was also required to establish a baseline of subject expertise. Participation was strictly voluntary, and informed consent was obtained from all participants to uphold ethical standards and encourage genuine engagement.

Efforts were made to foster a supportive environment conducive to honest feedback, minimizing social desirability bias. Key strategies included guaranteeing anonymity and confidentiality, emphasizing the voluntary nature of participation, and enabling private, self-administered survey completion. Data collection took place during professional development seminars—a familiar setting for reflective practice—where teachers could feel comfortable sharing candid responses. Trained researchers facilitated the assessments neutrally, further reducing any potential influence on participant feedback. These steps aimed to elicit reliable and authentic data on teachers' experiences and perspectives.

The study utilized validated and reliable questionnaires to measure self-efficacy, grit, metacognition, and work engagement. These instruments were carefully selected for their established robustness in educational research, ensuring consistent and valid assessment of each construct.

Measures

Work engagement

To measure work engagement, the present study utilized the Chinese adaptation of the Utrecht Work Engagement Scale (UWES). This validated instrument, initially developed by Schaufeli and colleagues [39] and subsequently adapted for the Chinese context by Yi-wen and Yi-qun [90], has been widely used and demonstrated reliability and validity within this population. The UWES was chosen for its strong psychometric properties and its ability to assess the three key dimensions of work engagement: vigor, dedication, and absorption. Participants responded to items on a seven-point Likert scale, ranging from 0 (never) to 6 (always), reflecting the frequency with which they experience these facets of work engagement.

Teacher metacognition

In this study, the Teacher Metacognition Inventory (TMI), designed by Jiang and colleagues [14], was employed to gauge educators' metacognitive understanding. This self-report tool comprises 28 items that collectively assess six distinct dimensions of teacher metacognition: personal experience with metacognitive processes, knowledge of pedagogical approaches within a metacognitive framework, reflective practices on teaching, self-awareness in the context of metacognition,

metacognitive planning for instruction, and ongoing metacognitive monitoring of teaching activities. Participants indicated their level of agreement with each item on a Likert scale from 1 (strongly disagree) to 5 (strongly agree).

Teacher self-efficacy

The Teachers' Sense of Efficacy Scale (TSES) developed by Tschannen-Moran and Hoy [2] was used to assess participants' self-efficacy beliefs. This measure focuses on educators' perceived competence in areas such as implementing effective teaching strategies, motivating students to learn, and maintaining a positive classroom environment. Participants rated their confidence in these domains on a Likert scale ranging from 1 ("nothing") to 5 ("a great deal"). Furthermore, the validity and reliability of the TSES for assessing teacher efficacy have been supported within the Chinese context [91].

Teacher grit

In this study, the grit levels of EFL teachers were measured using a self-administered questionnaire, which was validated by Sudina et al. [92]. The questionnaire included 14 items designed to evaluate two components of grit related to L2 teaching: perseverance of effort (PE) and consistency of interest (CI). Participants were instructed to rate their agreement with each statement on a 5-point Likert scale, with responses ranging from 1 (not at all like me) to 5 (very much like me). The applicability and psychometric properties of this scale have been supported in research conducted within the Chinese EFL context [38].

Data analysis

Statistical analyses were performed using SPSS v24 and AMOS v26. Descriptive statistics and assessments of skewness and kurtosis were conducted to ensure data normality, in line with recommendations by Byrne [93]. A two-phase structural equation modeling (SEM) approach, as suggested by Hair et al. [94], was employed. First, Confirmatory Factor Analysis (CFA) was performed to evaluate the measurement model's adequacy in capturing the underlying constructs. Following confirmation of the measurement model's fit, the structural model was tested to examine hypothesized relationships among variables.

Model fit was assessed using multiple indices: Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR), Chi-Square/Degree of Freedom Ratio, Comparative Fit Index (CFI), Goodness-of-Fit Index (GFI), and Tucker-Lewis Index (TLI). Thresholds for acceptable and good fit were based on established guidelines [75–99]. Indirect effects were evaluated using a bootstrapping approach with 5,000 resamples to obtain robust confidence intervals, particularly valuable in cases where normality assumptions might not be fully met [100].

Given the study's objective to compare EFL teachers in Mainland China and Hong Kong, multi-group SEM was selected as the primary analytical strategy. This approach is advantageous as it allows for the simultaneous testing of the proposed model across different groups within a single analytical framework, enabling direct statistical comparisons of path coefficients to determine if relationships between variables differ significantly across contexts [93, 98]. While separate SEM analyses could be run for each group, multi-group SEM provides formal tests of differences, making it the more appropriate and rigorous method for addressing our comparative research questions. To prepare for this comparison and account for the cross-cultural nature of the data, multi-group CFA was first conducted to establish measurement invariance across the Mainland China and Hong Kong samples [101]. Upon confirming measurement invariance, multi-group SEM was then used to compare the structural relationships between the two regions.

Results

Preliminary analyses

The preliminary analyses involved calculating descriptive statistics, reliability (Cronbach's alpha), and bivariate correlations for the primary study variables—self-efficacy, teacher grit, teaching metacognition, and work engagement—in both mainland China and Hong Kong. These results are presented in Table 1.

As summarized in Table 1, the mean scores for each variable were generally similar between the two regions, though Hong Kong teachers reported slightly higher self-efficacy, while teachers in mainland China exhibited marginally higher teaching metacognition. All skewness and kurtosis values fell within acceptable ranges (± 2 for skewness and ± 7 for kurtosis), confirming the assumption of normality necessary for further statistical analyses. The reliability analyses revealed Cronbach's alpha values exceeding 0.80 for all variables, indicating good internal consistency across both samples.

To examine regional differences, independent samples t-tests were conducted, revealing a significant difference in self-efficacy between Hong Kong and mainland China, $t(590) = 4.12, p < .001 t(590) = 4.12, p < .001 t(590) = 4.12, p < .001$, with a medium effect size (Cohen's $d = 0.34$). No significant differences were observed for grit, teaching metacognition, or work engagement.

Correlations among the constructs

As presented in Table 1, the bivariate correlations among self-efficacy, grit, teaching metacognition, and work

Table 1 Descriptive statistics, reliability, and correlations among constructs by region

Region / variables	Self-Efficacy	Grit	Metacognition	Work engagement
Mainland				
Mean	3.05	3.28	3.70	3.92
SD	0.53	0.56	0.68	0.52
Skewness	-0.12	-0.07	-0.10	-0.08
Kurtosis	0.13	0.12	0.16	0.13
Cronbach's Alpha	0.82	0.86	0.89	0.83
Self-Efficacy	1.00	0.32**	0.48**	0.55**
Grit	-	1.00	0.38**	0.28**
Metacognition	-	-	1.00	0.45**
Work Engagement	-	-	-	1.00
Hong Kong				
Mean	3.22	3.24	3.60	3.86
SD	0.48	0.60	0.75	0.56
Skewness	-0.14	-0.09	-0.12	-0.10
Kurtosis	0.10	0.08	0.14	0.09
Cronbach's Alpha	0.78	0.84	0.87	0.79
Self-Efficacy	1.00	0.39**	0.44**	0.60**
Grit	-	1.00	0.43**	0.34**
Metacognition	-	-	1.00	0.52**
Work Engagement	-	-	-	1.00

Note **$p < .01$

engagement were uniformly positive and statistically significant in both mainland China and Hong Kong. This indicates a robust and consistent pattern of interrelationships across the variables, although subtle variations in correlation strength were observed between the two regions.

In mainland China, self-efficacy exhibited moderate positive correlations with grit ($r = .32$, $p < .01$), teaching metacognition ($r = .48$, $p < .01$), and work engagement ($r = .55$, $p < .01$). The positive correlation between grit and teaching metacognition ($r = .38$, $p < .01$) suggests that persistence is linked with reflective practices in this context. Meanwhile, teaching metacognition correlated positively

with work engagement ($r = .45$, $p < .01$), indicating that metacognitively active teachers are more engaged.

In Hong Kong, self-efficacy showed a slightly stronger correlation with work engagement ($r = .60$, $p < .01$) compared to mainland China, perhaps reflecting a greater emphasis on personal agency in Hong Kong's educational context. The correlation between grit and metacognition was also marginally higher in Hong Kong ($r = .43$, $p < .01$), suggesting that teachers with high grit might be more inclined toward reflective practices in this setting. These subtle variations suggest potential cultural influences on the interactions among these psychological constructs.

Measurement model

To ensure comparability of constructs across the mainland China and Hong Kong samples, multi-group CFA were conducted to establish measurement invariance [101]. Table 2 provides a summary of the CFA results, illustrating the fit indices for configural, metric, scalar, and partial scalar invariance models.

The analysis began with configural invariance, where the same factor structure was tested across both groups with freely estimated parameters, yielding a good model fit (CFI = 0.955, RMSEA = 0.042). This step confirmed that the basic factor structure was consistent across regions. Following this, metric invariance was assessed by constraining factor loadings to be equal across groups. This model also maintained good fit indices (CFI = 0.952, RMSEA = 0.043), and the chi-square difference test indicated that factor loadings were invariant across the two contexts ($\Delta\chi^2 = 37.53$, $\Delta df = 21$, $p = .02$).

Next, scalar invariance was tested by further constraining the intercepts of the observed indicators, aiming to determine if the means of the latent constructs were comparable across groups. However, this model showed a slightly reduced fit (CFI = 0.946, RMSEA = 0.045), and the chi-square difference test indicated non-equivalence ($\Delta\chi^2 = 49.65$, $\Delta df = 21$, $p < .001$), suggesting that scalar invariance may not fully hold. To address this, partial scalar invariance was examined by relaxing constraints on the intercepts of items with the largest discrepancies. This adjustment improved the model fit (CFI = 0.949, RMSEA = 0.044), with no significant difference from the metric model ($\Delta\chi^2 = 22.28$, $\Delta df = 15$, $p = .10$), indicating that partial scalar invariance was suitable for supporting meaningful cross-group comparisons of latent means and structural relationships.

Table 2 Multi-group confirmatory factor analysis results

Model	χ^2	df	χ^2/df	*p*-value	CFI	TLI	RMSEA (90% CI)	$\Delta\chi^2$	Δdf	Δp
Configural Invariance	825.62	350	2.36	< 0.001	0.955	0.948	0.042 (0.037, 0.047)	—	—	—
Metric Invariance	863.15	371	2.33	< 0.001	0.952	0.946	0.043 (0.038, 0.048)	37.53	21	0.02
Scalar Invariance	912.80	392	2.33	< 0.001	0.946	0.940	0.045 (0.040, 0.050)	49.65	21	< 0.001
Partial Scalar Invariance	885.43	387	2.29	< 0.001	0.949	0.943	0.044 (0.039, 0.049)	22.28	15	0.10

In summary, achieving partial scalar invariance indicates that factor structures and loadings were generally consistent across both regions, with minor variations in the intercepts of specific indicators. This result enables reliable cross-regional comparisons while accounting for subtle item-level differences in interpretation between mainland China and Hong Kong.

Structural model comparison across regions

Following the establishment of partial scalar invariance for the measurement model, multi-group SEM was conducted. This approach allowed for the simultaneous testing of the hypothesized relationships within the Mainland China (MC) and Hong Kong (HK) samples and the identification of significant differences in structural paths between these groups.

First, an unconstrained model, where all structural path coefficients were allowed to vary freely between the MC and HK groups, was estimated. This model demonstrated a good fit to the data (χ^2 = 595.32, df = 304, χ^2/df = 1.96, p <.001; CFI = 0.962; TLI = 0.953; RMSEA = 0.034, 90% CI [0.028, 0.040]), indicating that the hypothesized model structure provided a valid representation of the relationships within each regional sample.

Table 3 presents the standardized path coefficients (β), 95% confidence intervals (CIs), significance levels, and total effects derived from this unconstrained model for both the MC and HK samples. Figure 2 provides a visual depiction of the structural models with estimated path coefficients for each group. The model accounted for substantial variance in work engagement within each regional sample (R^2 = 0.46 for MC, R^2 = 0.58 for HK), underscoring its explanatory power across contexts.

As detailed in Table 3 and illustrated in Fig. 2, the core hypotheses were largely supported within both regional samples. In both MC and HK, self-efficacy, grit, and teaching metacognition each had significant positive direct effects on work engagement. Furthermore, teaching metacognition served as a significant mediator for the effects of both self-efficacy and grit on work engagement in both groups.

To compare the path strengths across regions, the unconstrained model was compared against a fully constrained model where all structural paths were forced to be equal between the MC and HK groups. The constrained model also demonstrated acceptable fit (χ^2 = 621.50, df = 320, χ^2/df = 1.94, p <.001; CFI = 0.958; TLI = 0.949; RMSEA = 0.035, 90% CI [0.029, 0.042]). However, a chi-square difference test indicated a statistically significant difference between the fit of the unconstrained and constrained models ($\Delta\chi^2$ = 26.18, Δdf = 16, p =.05), confirming that the strength of certain structural relationships varied significantly between the MC and HK samples.

Formal parameter difference tests (z-tests) allowed for the identification of key regional differences. First, the direct positive effect of self-efficacy on work engagement was significantly stronger for teachers in HK

Table 3 Multi-group SEM results for Mainland China and Hong Kong samples

Path	Region	β	95% Confidence interval	Effect type
Direct Effects				
Self-Efficacy → Work Engagement	Mainland China	0.38**	[0.31, 0.45]	Direct
	Hong Kong	0.52***	[0.44, 0.60]	Direct
Grit → Work Engagement	Mainland China	0.28**	[0.21, 0.35]	Direct
	Hong Kong	0.30**	[0.22, 0.38]	Direct
Teaching Metacognition → Work Engagement	Mainland China	0.43***	[0.36, 0.50]	Direct
	Hong Kong	0.51***	[0.43, 0.59]	Direct
Self-Efficacy → Teaching Metacognition	Mainland China	0.43***	[0.35, 0.55]	-
	Hong Kong	0.40***	[0.32, 0.48]	-
Grit → Teaching Metacognition	Mainland China	0.37***	[0.29, 0.45]	-
	Hong Kong	0.44***	[0.35, 0.55]	-
Indirect Effects via Teaching Metacognition				
Self-Efficacy →… → Work Engagement	Mainland China	0.18**	[0.13, 0.24]	Indirect
	Hong Kong	0.20**	[0.14, 0.26]	Indirect
Grit →… → Work Engagement	Mainland China	0.16*	[0.09, 0.22]	Indirect
	Hong Kong	0.22**	[0.15, 0.29]	Indirect
Total Effects on Work Engagement				
Self-Efficacy → Work Engagement	Mainland China	0.56***	[0.47, 0.65]	Total
	Hong Kong	0.72***	[0.63, 0.81]	Total
Grit → Work Engagement	Mainland China	0.44***	[0.35, 0.53]	Total
	Hong Kong	0.52***	[0.42, 0.62]	Total

Note β = Standardized path coefficient. Effect Type indicates paths within the model; Total Effect shows the overall impact on Work Engagement. *p <.05, **p <.01, ***p <.001._
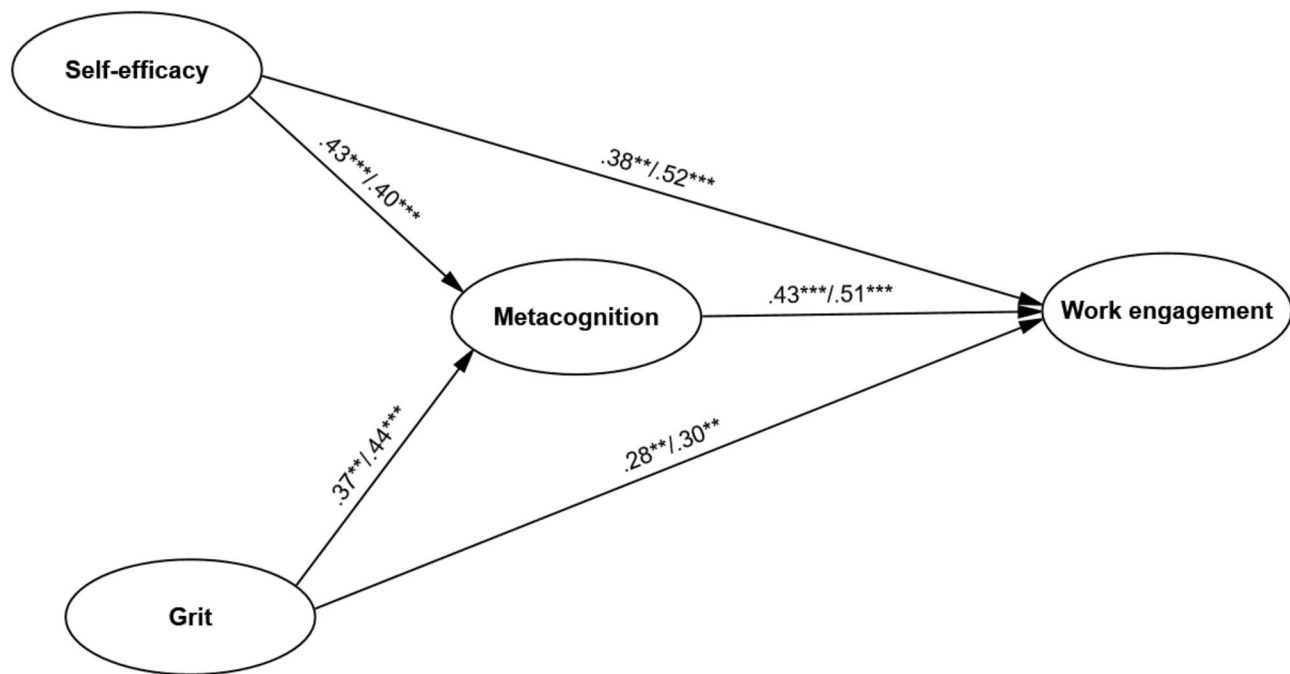
Fig. 2 Structural models of work engagement showing path coefficients for mainland China and Hong Kong samples

($\beta = 0.52$, $p < .001$) than for those in MC ($\beta = 0.38$, $p < .01$; $z = 2.50$, $p = .012$). Second, the indirect effect of grit on work engagement via teaching metacognition was stronger in the HK sample ($\beta = 0.22$, $p < .01$) compared to MC ($\beta = 0.16$, $p < .05$), a difference largely attributable to the significantly stronger path from grit to teaching metacognition among HK teachers ($\beta = 0.44$, $p < .001$) relative to their MC counterparts ($\beta = 0.37$, $p < .01$; $z = 2.10$, $p = .036$).

These findings highlight that while the proposed model consistently applies across both regional contexts, the specific influence of self-efficacy and the interplay between grit and teaching metacognition in fostering work engagement manifests with distinct magnitudes across MC and HK, potentially reflecting sociocultural influences warranting further exploration.

Discussion

The findings of this study contribute to a nuanced understanding of work engagement among EFL teachers in mainland China and Hong Kong, particularly by examining how self-efficacy, grit, and metacognition shape engagement within these distinct cultural contexts. In the following discussion, we elaborate on the observed

relationships between these constructs and their implications for the broader EFL teaching literature.

Our results confirm a positive association between teacher self-efficacy and work engagement, particularly within EFL settings where educators navigate diverse student language proficiencies, cultural backgrounds, and learning styles [58, 59]. Self-efficacious teachers are more likely to adjust their approaches to address mixed-ability classrooms, thereby sustaining their enthusiasm and dedication even when faced with the slower progress characteristic of second language acquisition. Notably, our finding of a significantly stronger direct effect of self-efficacy on work engagement in Hong Kong warrants interpretation. This difference is likely influenced by educational policies promoting greater teacher autonomy, such as School-Based Management (SBM) [23]. We speculate that this autonomy provides teachers in Hong Kong more latitude to act directly upon their efficacy beliefs—experimenting with methods, tailoring instruction, and taking ownership of classroom practices. Such actions provide direct mastery experiences, reinforcing efficacy [26], and allow efficacy beliefs to translate more readily into observable work engagement. By contrast,

mainland China's educational emphasis on a standardized curriculum and high-stakes examinations [4] may limit teachers' opportunities to enact their efficacy beliefs in personalized ways, potentially buffering the direct pathway between feeling efficacious and demonstrating behavioral engagement. The findings align with prior studies that suggest self-efficacy enables teachers to implement diverse strategies, manage cultural diversity, and effectively address language proficiency complexities in the classroom [18, 12].

Differing professional development (PD) approaches likely compound this effect. In Hong Kong, PD often emphasizes reflective teaching and critical thinking [24], fostering agentic teacher self-efficacy. By encouraging teachers to evaluate practice, experiment, and learn collaboratively (e.g., through peer observation), such PD helps build confidence via shared mastery and vicarious experiences, strengthening belief in their capacity to handle classroom challenges effectively [26]. Mainland China's PD, conversely, tends to prioritize content knowledge and standardized techniques aligned with national standards [25]. While building essential competence, this focus may cultivate less agentic self-efficacy. We argue this is because emphasizing prescribed methods over adaptive problem-solving potentially limits teachers' opportunities to develop a sense of personal control and competence derived from successfully navigating challenges independently or implementing their own innovative solutions—experiences crucial for robust self-efficacy according to Bandura [26]. Consequently, teachers may feel constrained, reducing chances to build the confidence that fuels engagement. These differences illustrate how educational policies and structures influence self-efficacy expression and, consequently, the strength of its link to teacher engagement in each context.

Teacher grit, characterized by sustained passion and perseverance, is also crucial in EFL education, where progress can be incremental. The patience required to achieve long-term language learning outcomes necessitates a high degree of grit, as teachers work toward goals such as language fluency that may take years to materialize [31, 70]. This commitment to long-term objectives, particularly in classrooms with diverse student backgrounds and proficiency levels, supports sustained teacher engagement [53]. In Confucian heritage cultures like mainland China, norms that emphasize perseverance, diligence, and lifelong learning may encourage teachers to view persistent effort as a moral duty and a personal virtue [17, 18]. Thus, teachers may be motivated to persevere not only for personal achievement but also to fulfill societal expectations and contribute to collective goals [102]. In Hong Kong, while Confucian values remain influential, a greater emphasis on individualism may lead teachers to focus more on personal professional development and fulfillment [19]. Understanding these cultural nuances helps explain the contextual variations in grit's influence on teacher engagement. Furthermore, our finding of a stronger *indirect* effect of grit on work engagement via metacognition in Hong Kong merits discussion. We propose this reflects the unique demands and affordances of the Hong Kong context. Its dynamic educational environment, characterized by ongoing reforms [8], requires teachers not only to persist (grit) but crucially, to adapt reflectively (metacognition) to remain effective [69]. Coupled with a cultural and professional development environment that is arguably more supportive of reflective practice and critical thinking [19, 12, 24], this synergy between perseverance and reflection may represent a particularly potent pathway to sustained engagement for teachers in Hong Kong. Conversely, if metacognitive reflection is less emphasized or potentially discouraged by cultural norms favouring harmony in Mainland China [103], this specific indirect pathway from grit to engagement might be weaker.

Our findings also indicate that teaching metacognition mediates the relationship between self-efficacy, grit, and engagement, underscoring the importance of reflective practices in EFL contexts where teachers must frequently adapt their methods to address varying language learning needs [13, 63]. In EFL classrooms, metacognitive strategies allow teachers to monitor student responses, adjust instructional techniques, and tackle linguistic and cultural challenges effectively [64, 65]. For instance, metacognitive approaches help teachers evaluate the efficacy of specific language tasks and adapt their methods to better suit their students' diverse needs, a particularly valuable skill in EFL settings [32, 34]. Our data further indicate that reflective practices, such as self-evaluation and critical reflection on teaching experiences, are more closely associated with work engagement than planning or monitoring activities. This suggests that encouraging deeper reflection may be especially beneficial for teacher engagement. In mainland China, cultural expectations of respect for authority and maintaining harmony may inhibit open reflection or critique of established methods [103], potentially limiting metacognitive engagement. In contrast, Hong Kong's educational culture, influenced by both Eastern and Western philosophies, is more supportive of reflective teaching and critical thinking [19, 12], which may enhance metacognition's mediating role and contribute to the stronger indirect effect of grit noted earlier.

The observed differences between mainland China and Hong Kong highlight how cultural and educational contexts shape the interplay among self-efficacy, grit, metacognition, and engagement. Hong Kong's educational system, characterized by greater teacher autonomy and a blend of Eastern and Western educational philosophies,

seems to amplify the effects of self-efficacy directly and grit indirectly (via metacognition) on engagement [8, 12]. Teachers in Hong Kong often have more opportunities to exercise professional judgment and pursue innovative teaching methods, thus strengthening the impact of their self-efficacy and grit on engagement. In mainland China, the more standardized and hierarchical educational structure may limit teacher autonomy [4]. However, the mediating role of metacognition in this context suggests that fostering reflective practices could enhance engagement despite systemic constraints. By engaging in metacognitive activities, teachers may navigate these limitations and remain connected to their professional roles.

Both regions share a Confucian heritage that values harmony, respect for authority, perseverance, and the societal importance of education [17, 18]. Yet, these values manifest differently due to historical and sociopolitical influences [19, 20]. In mainland China, a focus on collectivism and hierarchy may lead teachers to prioritize conformity and adherence to established methods, potentially inhibiting self-efficacy and reflective practices [104]. Emphasis on harmony may discourage open critique and innovation in teaching methods. In contrast, Hong Kong's exposure to Western educational values encourages individualism and critical thinking, allowing teachers greater freedom to engage in metacognitive practices and express self-efficacy and grit [19, 12]. Tam et al. [20] highlight how emotional intelligence influences student motivation within a Confucian heritage context, underlining cultural impacts on educational outcomes. Furthermore, the importance of affective dimensions in teaching effectiveness is increasingly recognized. Lo's [36] work in higher education, for example, demonstrates how fostering emotional connections and utilizing engaging hybrid strategies can positively influence student self-efficacy and achievement. Extrapolating to the teacher context, incorporating strategies that build supportive emotional climates within schools or professional development (e.g., fostering peer support, acknowledging emotional labor), and equipping teachers with engaging pedagogical techniques suitable for diverse formats (hybrid or face-to-face), could similarly bolster *teacher* self-efficacy and work engagement across both Mainland China and Hong Kong [36]. Such approaches address fundamental emotional and motivational needs by potentially enhancing positive affective states associated with teaching and providing mastery experiences with engaging strategies, thereby supporting resilience and satisfaction irrespective of differing cultural or systemic pressures. These cultural and affective distinctions shape teachers' perceptions of self-efficacy and grit, thus influencing their engagement levels. Recognizing these differences is essential for developing culturally responsive strategies to enhance teacher engagement in each context.

By situating these findings within the broader educational and cultural frameworks of mainland China and Hong Kong, this study provides a deeper understanding of the factors influencing teacher engagement in EFL settings. Through targeted interventions that consider both shared and unique cultural influences, educational policies can better support teacher effectiveness and well-being.

Conclusion

This study highlights the interconnected roles of self-efficacy, grit, and metacognition in shaping work engagement among EFL teachers in mainland China and Hong Kong. The findings underscore self-efficacy and grit as key drivers of engagement, reflecting the importance of teachers' confidence and perseverance. Notably, metacognition emerges as a critical mediator, supporting teachers in adapting instructional methods to sustain engagement. The varying effects across the two regions emphasize the influence of cultural and institutional contexts. Hong Kong's autonomy-focused educational environment appears to strengthen the roles of self-efficacy and metacognition in engagement, while mainland China's collectivist, standardized approach modifies how self-efficacy and grit contribute to engagement. This insight underscores engagement as both an individual and context-dependent outcome, shaped by institutional and cultural values. These findings add to EFL teacher engagement research by empirically affirming the roles of self-efficacy, grit, and metacognition across different educational contexts and offer a foundation for developing strategies to support engagement within the specific demands of EFL instruction.

Implications

This study extends SCT by integrating grit and metacognition, providing a multi-dimensional framework for examining EFL teacher engagement. While SCT typically highlights self-efficacy's role in influencing motivation and behavior, our findings indicate that grit adds perseverance and metacognition enhances adaptability, both essential for sustained engagement in demanding educational contexts. Including these constructs offers a broader view of teacher engagement, showing that it requires belief in capabilities, resilience, and adaptability in practice.

The study also emphasizes how cultural and institutional values shape motivational dynamics around self-efficacy and grit in different educational settings. The variations observed between Hong Kong's autonomy-oriented system and the collectivist, goal-focused environment of mainland China underscore the importance

of contextual factors within SCT. These insights suggest future models should incorporate cultural considerations to better capture how self-efficacy and grit function across diverse educational systems.

On a practical level, these findings encourage educational administrators in both regions to design professional development programs tailored to strengthen EFL teachers' self-efficacy, grit, and metacognition. In Hong Kong, where autonomy is prioritized, programs could focus on self-efficacy and metacognition through reflective practices and strategies for independent learning, including workshops on personal goal-setting and pedagogical innovation. For example, school administrators could encourage teachers to maintain reflective journals or use self-assessment checklists to monitor their teaching progress, supported by occasional peer discussions to ensure accountability. In mainland China, where collective goals are emphasized, professional development could center on team-based strategies that build collective efficacy, such as collaborative training, peer mentoring, and shared goal-setting exercises to foster a sense of unity and purpose. To make use of mainland China's collectivist values, policymakers could promote peer observation groups, where teachers observe each other's lessons and meet to discuss strengths and areas for improvement as a team. This turns reflection into a group effort, fitting the cultural focus on cooperation and shared success.

To support teacher metacognition across both regions, schools could establish institutional mechanisms that encourage reflective practices. Allocating time for self-reflection, peer feedback, and action research would cultivate adaptability and metacognitive awareness. Hong Kong's decentralized system supports individual reflection, while mainland China might integrate these practices into team-based sessions that align with collective values. In mainland China, for instance, schools could hold regular team meetings where teachers review their teaching outcomes together and plan adjustments as a group, reinforcing reflection as a collective responsibility. In Hong Kong, administrators could provide structured time for teachers to reflect individually, perhaps using guided questions to deepen their thinking.

Given the role of grit in maintaining engagement, resilience-focused initiatives, such as stress management workshops and support networks, could help teachers navigate EFL-specific challenges. Public school teachers, facing larger class sizes and resource limitations, would benefit from additional support to mitigate these stresses, enhancing their engagement and professional growth. Policymakers in both regions could fund training on managing classroom stress, with mainland China emphasizing group-based support networks and Hong Kong focusing on individual coping strategies. In

better-resourced private schools, grit-focused initiatives might promote sustained professional development and incremental growth within their roles.

Finally, the study highlights that public school teachers may rely more on grit to sustain engagement under challenging conditions. This finding points to a need for differentiated support, where enhanced resources and administrative assistance could alleviate some of the demands on public school teachers, while private schools focus on long-term career pathways that promote professional growth.

Limitations and future directions

Although this study makes significant contributions, it has several limitations that future research could address to enhance our understanding of EFL teacher engagement. While purposive sampling was used to select schools based on location, type (public and private), and resource availability, this approach may introduce selection bias by not fully capturing the diversity of EFL teaching environments in mainland China and Hong Kong. We chose urban and suburban schools with varying levels of resources to reflect a range of typical settings, but rural schools or those with specialized programs might be underrepresented. To reduce bias, we ensured the sample included teachers from both well-funded and modestly resourced schools, yet some unique contexts, like very remote or experimental schools, may still be missing. Future research could include additional regions or countries, as well as a broader mix of school types such as rural or under-resourced settings, to provide a more complete perspective on how self-efficacy, grit, and metacognition influence engagement across diverse cultural and educational settings.

The cross-sectional design of the study also limits the ability to establish causality among self-efficacy, grit, metacognition, and engagement. Longitudinal studies would offer insight into how these constructs interact and evolve over time, especially in response to changes like new educational policies or curriculum updates.

Additionally, while the study focused on individual psychological factors, it did not consider the role of contextual influences, such as administrative support, leadership, and community involvement, which may shape engagement. Future research could include these external factors to offer a more holistic view of teacher engagement.

While mainland China and Hong Kong were treated as distinct contexts, this study did not capture potential intra-regional differences. Within each region, there may be significant variations between urban and rural schools that could influence teacher engagement. For instance, rural schools might face challenges like limited access to teaching materials, fewer professional development

opportunities, or geographic isolation, which could lower teachers' self-efficacy or persistence. Urban schools, on the other hand, might have better resources and support but could also deal with larger classes or greater pressure to perform, potentially affecting engagement differently. These differences could shape how self-efficacy, grit, and metacognition play out in practice, and future research should examine them to better understand how local settings impact EFL teachers. Further research could also explore provincial or district-level variations to understand how specific local factors impact engagement and effectiveness.

Finally, future studies could examine interventions aimed at enhancing metacognitive practices among EFL teachers. Evaluating the impact of targeted training programs on metacognition could provide valuable insights into fostering sustained engagement and professional growth, offering practical guidance for institutions to support reflective teaching.

Abbreviations

CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
EFL	English as a Foreign Language
GFI	Goodness-of-Fit Index
HK	Hong Kong
MC	Mainland China
PD	Professional Development
RMSEA	Root Mean Square Error of Approximation
SCT	Social Cognitive Theory
SEM	Structural Equation Modeling
SRMR	Standardized Root Mean Square Residual
TLI	Tucker-Lewis Index
TMI	Teacher Metacognition Inventory
TSES	Teachers' Sense of Efficacy Scale
UWES	Utrecht Work Engagement Scale

Supplementary Information

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Supplementary Material 1

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