



OPEN ACCESS

EDITED BY
Samantha Curle,
University of Bath, United Kingdom

REVIEWED BY
Noble Lo,
Lancaster University, United Kingdom
Atefeh Nasrollahi Mouziraji,
Islamic Azad University of Ayatollah Amoli,
Iran

*CORRESPONDENCE
Hui-Ling Hu
✉ huling0215@ntub.edu.tw

RECEIVED 28 January 2025
ACCEPTED 18 June 2025
PUBLISHED 22 July 2025

CITATION
Guan Y, Du L, Yang C and Hu H-L (2025)
Exploring the roles of self-actualization,
language self-efficacy, and academic
emotions in EMI students' achievement:
a structural equation modeling approach.
Front. Educ. 10:1567143.
doi: 10.3389/feduc.2025.1567143

COPYRIGHT
© 2025 Guan, Du, Yang and Hu. This is an
open-access article distributed under the
terms of the [Creative Commons Attribution
License \(CC BY\)](https://creativecommons.org/licenses/by/4.0/). The use, distribution or
reproduction in other forums is permitted,
provided the original author(s) and the
copyright owner(s) are credited and that the
original publication in this journal is cited, in
accordance with accepted academic
practice. No use, distribution or reproduction
is permitted which does not comply with
these terms.

Exploring the roles of self-actualization, language self-efficacy, and academic emotions in EMI students' achievement: a structural equation modeling approach

Yuan Guan¹, Lili Du², Chao Yang³ and Hui-Ling Hu^{4*}

¹International College, Dalian University, Dalian, Liaoning, China, ²College of Philosophy, Dalian University, Dalian, Liaoning, China, ³City Institute, Dalian University of Technology, Dalian, Liaoning, China, ⁴Institute of Creative Design and Management, National Taipei University of Business, Taoyuan, Taiwan

Introduction: Students in English Medium Instruction (EMI) environments encounter unique challenges, including the simultaneous demands of language acquisition and academic achievement. This study explores how psychological factors –specifically self-actualization, language self-efficacy, internal locus of control, and learning anxiety –affect academic performance among Chinese university students enrolled in EMI programs.

Methods: Data were collected through 480 valid questionnaires completed by students from diverse academic disciplines. A structural equation modeling (SEM) approach was utilized to examine both the direct and indirect effects of self-actualization and language self-efficacy on academic achievement, with internal locus of control and learning anxiety as mediating variables.

Results: The findings indicate that self-actualization significantly enhances internal locus of control, which in turn positively affects academic achievement. Although self-actualization also reduces learning anxiety, its indirect effect on academic performance via this pathway is comparatively weaker. Language self-efficacy was found to both reduce learning anxiety and directly improve academic achievement. Among the mediators, internal locus of control exerted the most substantial influence, highlighting its role as a key psychological determinant of academic success.

Discussion: This study contributes to the theoretical understanding of psychological and emotional variables in EMI contexts. The findings underscore the importance of fostering internal locus of control, managing learning anxiety, and enhancing language self-efficacy to support academic achievement. Practical implications include targeted interventions and support strategies to help EMI students navigate their dual learning demands more effectively.

KEYWORDS

English Medium Instruction, self-actualization, language self-efficacy, internal locus of control, learning anxiety, academic achievement

1 Introduction

Over the past decades, the global higher education system has undergone rapid internationalization, with an increasing number of institutions integrating English with content-based disciplines to meet the growing demand for English proficiency (Derakhshan et al., 2023; Rahman and Singh, 2022; Zhang and Pladevall-Ballester, 2022). Since the late 20th century, English Medium Instruction (EMI) has emerged as a prominent approach within global education systems. With the acceleration of globalization and the increasing mobility of international students, EMI has been regarded as a critical strategy in non-English-speaking countries to enhance academic standards and foster international literacy (Jablonkai and Hou, 2023; Macaro et al., 2018).

English Medium Instruction refers to the teaching of academic content through English in non-native English-speaking regions, aiming to achieve dual goals: advancing internationalization objectives and improving both content knowledge and English proficiency (Dearden, 2014; Hamid et al., 2015; Macaro et al., 2018; Rose et al., 2020). Its benefits include enhancing students' English language skills, expanding their global perspectives, and promoting intercultural communication (Peng and Xie, 2021; Querol-Julían and Crawford Camiciottoli, 2019; Sanahuja Vélez et al., 2020). Moreover, EMI strengthens the international reputation and competitiveness of higher education institutions (Ismailov et al., 2021; Jablonkai and Hou, 2023). The growth of EMI programs worldwide reflects the increasing need for EMI research in non-English-speaking countries (Macaro et al., 2018; Wächter and Maiworm, 2014).

The implementation of English Medium Instruction (EMI) in non-English disciplines at Chinese universities began in the late 20th century, initially as pilot bilingual programs at top-tier universities aimed at enhancing students' English proficiency and promoting internationalization (Jablonkai and Hou, 2023). With the acceleration of globalization, Sino-foreign collaborative education became a key model, fostering international exchange through dual-degree and student exchange programs (Peng and Xie, 2021). Starting in 2001, the Ministry of Education mandated that some courses be taught in English, with a target of converting 5%–10% of undergraduate courses to bilingual instruction (Hu, 2009; Hu and Lei, 2014). EMI courses subsequently expanded rapidly, with 132 out of 136 universities offering EMI programs by 2006. In 2020, the Ministry of Education introduced online EMI courses, providing English-taught content for international students. EMI programs have since been widely implemented in China, Pakistan, Japan, Malaysia, Bangladesh, and other countries (Aizawa and Rose, 2019; Ali and Hamid, 2020).

English Medium Instruction faces multiple challenges in its implementation. Dang et al. (2023) reviewed 115 studies and highlighted that EMI teachers often lack adequate preparation and support, emphasizing the need for both formal and informal professional learning opportunities. Macaro et al. (2018) provided a comprehensive review showing that while EMI offers some benefits for English proficiency, there is still a lack of clear evidence regarding its effectiveness in learning subject-specific content.

Moreover, non-native English-speaking students face significant challenges in achieving academic success in EMI programs. Language-related difficulties, such as deficiencies

in listening, speaking, reading, and writing skills, are among the primary reasons for poor academic performance (Ismailov et al., 2021; Kamaşak and Sahan, 2023; Shepard and Rose, 2023). Insufficient teacher training exacerbates this issue (Dang et al., 2023). Additionally, cultural differences in teaching approaches affect students' adaptation and engagement (Jablonkai and Hou, 2023). Language and cultural pressures further increase academic and psychological burdens on students (Peng et al., 2023).

Recent advances in educational psychology highlight the role of learning technologies and hybrid pedagogies in supporting student wellbeing and achievement. For instance, the “emotional bridge” model emphasizes how hybrid learning environments foster emotional stability, reduce anxiety, and strengthen self-efficacy (Lo, 2023). Similarly, generative AI tools have been shown to enhance students' perceived control, reduce cognitive load, and boost academic engagement (Lo et al., 2025). These frameworks are particularly relevant to EMI contexts, where learners often face dual challenges of language proficiency and content mastery. This study draws on these perspectives to explore how psychological and emotional factors shape academic achievement in EMI settings.

These challenges highlight that despite the rapid expansion of EMI in global higher education, significant obstacles remain in enhancing students' academic achievement. While existing studies have established the importance of language self-efficacy in academic success, there is a lack of systematic exploration into the relationships among self-actualization, language self-efficacy, and academic achievement in EMI students (Yuksel et al., 2023).

Furthermore, the mediating roles of internal locus of control and learning anxiety in academic achievement have yet to be thoroughly examined. Previous research indicates that internal locus of control significantly impacts academic performance, with students exhibiting higher levels of internal locus of control demonstrating greater academic confidence and achievement (Onyekuru and Ibegbunam, 2014; Shepherd et al., 2006). At the same time, learning anxiety is recognized as a critical factor influencing academic performance, but its specific effects on EMI students remain unclear (Yuksel et al., 2023).

Therefore, investigating how internal locus of control and learning anxiety mediate the effects of self-actualization and language self-efficacy on academic achievement can address existing research gaps and provide valuable insights into improving EMI outcomes.

This study aims to explore the factors influencing academic achievement in English Medium Instruction (EMI) settings, focusing on the relationships between self-actualization, language self-efficacy, and academic achievement. It examines the mediating roles of internal locus of control and learning anxiety. A research model is constructed with self-actualization and language self-efficacy as independent variables, academic achievement as the dependent variable, and internal locus of control and learning anxiety as mediators. Data collected through questionnaires will be analyzed to validate the relationships among variables and provide strategies to address challenges in EMI teaching, supporting students' academic success more effectively.

2 Literature review and research hypotheses

2.1 Self-actualization

Self-actualization refers to the process by which individuals fully realize their potential and achieve their true selves. It represents the highest level of pursuit in the hierarchy of human needs (Heylighen, 1992). According to Maslow's hierarchy of needs theory, self-actualization is built upon the satisfaction of physiological, safety, belongingness, and esteem needs. It signifies a deep-seated desire for personal growth, creativity, and self-exploration (Ortiz, 2020). Although this concept varies across cultures and contexts, its essence lies in encouraging individuals to maximize their potential, develop a profound understanding of themselves and the world, and achieve inner fulfillment through the realization of personal values (Gopinath, 2020).

Self-actualization is a critical source of psychological wellbeing and happiness, gaining considerable attention in humanistic psychology, education, and organizational behavior (Heylighen, 1992; Vittersø, 2004). It not only fosters psychological growth but also enhances individuals' sense of achievement and satisfaction in academic and professional domains (Dorer and Mahoney, 2006). In organizational contexts, self-actualization helps individuals adapt to complex situations and make rational decisions. In educational settings, encouraging students to explore their potential contributes to increased learning motivation and innovative capacities (Vittersø, 2004).

Research indicates that self-actualization can stimulate students' intrinsic motivation, promote goal-oriented behaviors, and positively impact sustained academic engagement and success (Pufal-Struzik, 1999). For instance, students with higher levels of self-actualization are more likely to adopt effective learning strategies, cope with stress and challenges, and maintain focus on their academic pursuits (Davidson et al., 2007). Additionally, the psychological health benefits associated with self-actualization further support its positive influence on academic performance. This mechanism is particularly relevant for students in English-Medium Instruction (EMI) settings, as self-actualization can help them overcome linguistic and academic challenges, thereby enhancing their academic achievement.

Previous studies have confirmed the significant predictive power of self-actualization on academic performance. For example, Pufal-Struzik, (1999) demonstrated a positive correlation between a high degree of self-actualization and academic performance. Davidson et al. (2007) further emphasized that the psychological health improvements fostered by self-actualization enable students to better handle stress and challenges, indirectly enhancing their academic achievement. Therefore, as an independent variable in this study, self-actualization effectively predicts and explains variations in EMI students' academic achievement.

2.2 Internal locus of control

Internal locus of control refers to an individual's sense of control over their own behavior and its outcomes, where they believe that results are primarily determined by personal effort rather than external circumstances or luck (Duttweiler, 1984).

Individuals with a high internal locus of control often perceive their achievements and failures as products of their own abilities and actions. This belief plays a significant role in psychological wellbeing, academic achievement, and workplace performance (Kesavayuth et al., 2020; Ng et al., 2006). The purpose of internal locus of control is to help individuals build confidence, promote goal-directed behavior, and demonstrate greater persistence and resilience when facing challenges (Kesavayuth et al., 2020).

Its impact is particularly evident in academic settings. Research has shown that students with a high sense of internal control are more proactive in addressing learning challenges and tend to perform better academically (Findley and Cooper, 1983; Sujadi and Aulianisya, 2020). For instance, Bagherzadeh Ladari et al. (2010) found that students with a high internal locus of control often view academic success as a result of their own effort, leading them to invest more actively in their studies. Additionally, internal locus of control is associated with academic adaptability and psychological resilience, enabling students to cope more effectively with challenges and improve their academic performance under stress (Mathur, 2014).

Not only does internal locus of control predict academic achievement, but it is also closely linked to psychological wellbeing. Individuals with a high internal locus of control tend to maintain a positive outlook and exhibit stronger self-regulation abilities in stressful situations (Kesavayuth et al., 2020). This suggests that an internal locus of control enhances quality of life, helping individuals achieve better outcomes in both academic and professional domains.

Self-actualization is a powerful intrinsic driver that enhances individuals' internal locus of control (Karnes and McGinnis, 1996). It motivates individuals to pursue their goals proactively, believing that success stems from their own efforts and abilities rather than external circumstances (Engqvist Jonsson and Nilsson, 2014). Research suggests that individuals with higher levels of self-actualization tend to exhibit a stronger internal locus of control, as they believe that outcomes can be influenced through effort. This self-directed value system helps individuals respond to challenges more actively in both learning and life, further strengthening their sense of control over their goals.

Based on the above theories and literature, this study proposes the following hypothesis:

H1: Self-actualization has a positive effect on the internal locus of control.

This study incorporates the internal locus of control as a variable to explore its impact on the academic achievement of EMI (English-Medium Instruction) students. By analyzing the relationship between self-actualization and the internal locus of control, the study aims to provide a deeper understanding of how students enhance their sense of control over academic outcomes through personal effort. This, in turn, contributes to improved academic achievement and offers theoretical support for educational strategies.

2.3 Learning anxiety

Learning anxiety refers to an emotional response to learning situations, typically characterized by feelings of worry, stress,

or fear related to learning tasks. This anxiety may arise from concerns about academic failure, difficulties in mastering new knowledge, and challenges in adapting to the learning environment (Phillips et al., 2015). Learning anxiety can be either temporary or a persistent barrier that affects long-term academic performance (Kang and Kim, 2021). Research suggests that moderate levels of anxiety can enhance focus during learning, while excessive anxiety disrupts the learning process, diminishing students' motivation and self-efficacy (Mineka and Oehlberg, 2008). High levels of learning anxiety may also lead to a decline in academic performance and trigger psychological health issues such as depression and stress (Phillips et al., 2015). Therefore, reducing learning anxiety is crucial for improving both academic performance and psychological wellbeing.

In English-Medium Instruction (EMI) environments, non-native English-speaking students face dual challenges: mastering subject knowledge while simultaneously developing language skills. Issues such as difficulties in language comprehension, cultural adaptation, and insufficient teaching support make learning anxiety a significant obstacle for EMI students (Kamaşak and Sahan, 2023; Lasagabaster and Fernández-Costales, 2024). Studies highlight that language anxiety is a primary source of learning anxiety in EMI courses, affecting students' confidence in language tasks and their classroom participation (Ormzyar, 2023). Moreover, high levels of learning anxiety hinder students' use of learning strategies, self-regulation abilities, and academic engagement, ultimately leading to poorer academic performance (Li et al., 2022).

The negative relationship between self-actualization and learning anxiety has been confirmed in multiple studies. Individuals with high levels of self-actualization are more likely to embrace challenges and focus on personal growth rather than fear of failure, which helps reduce learning anxiety (Kang and Kim, 2021). Furthermore, self-actualization enhances intrinsic motivation and emotional regulation, enabling individuals to demonstrate greater psychological resilience in stressful situations (Mohamadi et al., 2014). For instance, (Shang, 2024) highlighted that individuals with high self-actualization levels can regulate their emotions more effectively and maintain a positive response to stress during the learning process.

In EMI (English-Medium Instruction) contexts, the role of self-actualization becomes even more significant. Research by Huang and Mayer (2019) found that higher levels of self-actualization enable students to focus more on their learning goals, reducing fear of external pressures and failure, thereby effectively alleviating language anxiety.

Based on the above studies and supporting literature, the following hypothesis is proposed:

H2: Self-actualization has a negative effect on learning anxiety.

By examining learning anxiety as a mediating variable in the relationship between self-actualization and academic achievement, this study aims to provide deeper insights into how reducing learning anxiety can enhance the academic performance of EMI students. The findings can offer empirical support for designing more effective educational intervention strategies.

2.4 Language self-efficacy

Language self-efficacy refers to an individual's confidence in their ability to successfully perform the behaviors required for specific language learning tasks (Bandura, 1997). It is a self-perception related to language abilities, typically encompassing various language skills such as listening, speaking, reading, and writing (Kutuk et al., 2023). The level of language self-efficacy often influences the effort and persistence students exhibit in language learning. Research has shown that self-efficacy is a critical factor affecting students' learning motivation and academic performance, emphasizing goal-directed behaviors and emotional regulation (Bernacki et al., 2015). Enhancing students' language self-efficacy can promote more effective learning strategies, boost motivation, and improve learning outcomes.

Language self-efficacy has a profound impact on students' language learning and overall academic performance. Studies indicate that students with high language self-efficacy are more likely to take proactive actions, demonstrate stronger academic persistence, and exhibit greater confidence in language tasks (Shang, 2024). Furthermore, there is a significant correlation between language self-efficacy, learning strategies, language anxiety, and academic achievement. Particularly in English-Medium Instruction (EMI) courses, language self-efficacy is crucial for overcoming language barriers and improving students' language proficiency (Kutuk et al., 2023). Recent studies on generative AI suggest that tools like ChatGPT can enhance students' language learning confidence by reducing cognitive overload and supporting self-regulated learning (Lo et al., 2025). These technologies reinforce perceived control over academic tasks, directly aligning with the construct of language self-efficacy, particularly in EMI environments.

The influence of language self-efficacy on anxiety levels during the learning process has been extensively studied. Research demonstrates that learners with higher self-efficacy feel more confident in language learning, thereby significantly reducing foreign language learning anxiety (Zhao, 2022). Additionally, studies indicate a significant negative correlation between language learning anxiety and self-efficacy, suggesting that improving language self-efficacy can serve as an effective strategy for mitigating language learning anxiety (Lin, 2022). Based on this, it can be reasonably hypothesized that language self-efficacy negatively impacts learning anxiety.

H3: Language self-efficacy has a negative effect on learning anxiety.

2.5 Academic achievement

Academic achievement refers to the extent to which students meet academic goals or complete learning tasks within a specific educational environment. It is typically assessed through examination scores, course grades, or mastery of skills (Carrillo-López et al., 2022). Academic achievement is a multifactorial outcome influenced by personal abilities, learning habits, motivation, and environmental factors (Moghadari-Koosha

et al., 2020). The primary purpose of academic achievement is to evaluate students' learning outcomes and motivate them toward continuous improvement in their educational journey.

Moreover, academic achievement helps students build confidence and affirm their abilities (Camacho-Morles et al., 2021). Research indicates that academic achievement reflects not only students' academic capabilities but is also closely linked to their future career development and psychological wellbeing (Liu et al., 2020). Additionally, the interaction between academic achievement, self-efficacy, and learning strategies plays a critical role in enhancing academic performance and addressing educational challenges (Moghadari-Koosha et al., 2020).

Internal locus of control is widely recognized as an important psychological factor influencing academic achievement. Research indicates that students with a strong internal locus of control are more likely to attribute academic success to their own efforts and abilities, leading to proactive learning behaviors and the adoption of effective learning strategies (Dubey and Nayyar, 2016). Moreover, such students exhibit greater perseverance and confidence when facing challenges, further enhancing their academic performance (Albert and Dahling, 2016). Particularly in multicultural or high-challenge educational settings, a significant positive correlation has been observed between students' internal locus of control and their performance in subjects such as science and mathematics. This suggests that strengthening internal locus of control can improve learning outcomes (Kumaravelu, 2018).

H4: Internal locus of control has a positive effect on academic achievement.

Learning anxiety is widely regarded as a critical factor influencing academic achievement, especially in high-pressure academic contexts. Research shows that students with high levels of learning anxiety often display lower academic achievement due to reduced focus, disrupted learning processes, and impaired problem-solving abilities (Scarborough et al., 1961). Furthermore, learning anxiety leads students to adopt more passive learning strategies, decreasing the effectiveness of their studies (Kang and Kim, 2021). Studies also highlight that subject-specific anxieties, such as math anxiety, significantly affect performance in related disciplines, suggesting that different types of learning anxiety can have multiple negative impacts on academic achievement (Commodari and La Rosa, 2021).

H5: Learning anxiety has a negative effect on academic achievement.

The positive impact of language self-efficacy on academic achievement has been confirmed in numerous studies. Research indicates that students with higher levels of language self-efficacy are more likely to adopt effective learning strategies and better handle challenges in the learning process, resulting in higher academic achievement (Mills et al., 2007). For instance, a study on English learners in the Qinghai-Tibet Plateau region found a significant positive correlation between language self-efficacy and academic achievement. Moreover, language self-efficacy was a stronger predictor of academic performance than other factors such as learning strategies (Liu et al., 2020). Additionally, language self-efficacy has been shown to indirectly enhance students' language

abilities by boosting their learning motivation and emotional regulation, thereby promoting academic success (Mills et al., 2007).

H6: Language self-efficacy has a positive effect on academic achievement.

2.6 Mediating effect

The relationship between self-actualization and internal locus of control has been shown to play a crucial role in academic performance. Research suggests that self-actualization is closely related to students' intrinsic motivation for academic achievement and, by enhancing internal locus of control, helps students regulate their behaviors and direct their efforts more effectively in learning contexts (Karnes and McGinnis, 1996). Internal locus of control, as a personal belief, enables students to attribute success primarily to their own efforts and abilities, further improving their academic achievement (Albert and Dahling, 2016). Through internal locus of control, the mechanism by which self-actualization influences academic achievement can be conceptualized as strengthening students' sense of control over academic goals and their ability to self-regulate learning behaviors. This allows students to persist in the face of academic challenges and adopt effective learning strategies, ultimately achieving higher academic performance.

H7: Self-actualization positively influences academic achievement through the mediating effect of internal locus of control.

The impact of self-actualization on academic achievement can be explained through the mediating role of learning anxiety. Research suggests that students with lower levels of self-actualization are more prone to experiencing learning anxiety, which in turn disrupts their focus, diminishes self-confidence, and ultimately reduces academic achievement (Morosanova and Fomina, 2017). Additionally, learning anxiety undermines students' active engagement in academic activities, especially in cognitively demanding learning contexts, negatively affecting academic performance (Pintrich and De Groot, 1990).

On the other hand, students with higher levels of self-actualization are better equipped to cope with academic challenges, mitigating the adverse effects of learning anxiety on academic performance. Thus, enhancing students' self-actualization levels may serve as an effective strategy to reduce learning anxiety and improve academic achievement.

H8: Self-actualization negatively influences academic achievement through the mediating effect of learning anxiety.

Research indicates that language self-efficacy has a significant negative effect on learning anxiety, which in turn indirectly enhances academic achievement. Students with higher self-efficacy are better equipped to handle challenges during the learning process and experience less anxiety stemming from difficulties in language learning (Zhao, 2022). Furthermore, learning anxiety has been shown to disrupt students' focus and motivation, further

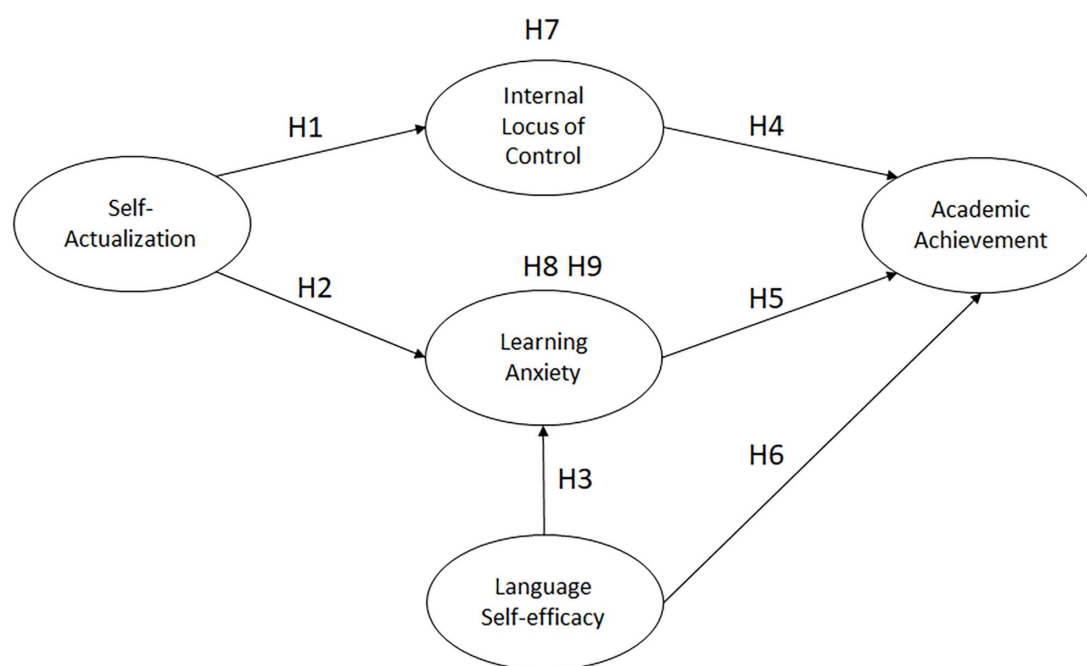


FIGURE 1
Research framework.

diminishing academic performance. By reducing learning anxiety, language self-efficacy can indirectly improve students' academic outcomes, a mechanism particularly evident among language learners (Safran et al., 2022).

Specifically, language self-efficacy enhances students' sense of control over learning tasks, alleviates communication apprehension, and reduces test anxiety related to language learning, thereby improving academic achievement (Mills et al., 2007).

H9: Language self-efficacy negatively influences academic achievement through the mediating effect of learning anxiety.

Based on the above discussions, the research framework and hypotheses proposed in this study are illustrated in Figure 1.

3 Research methodology

3.1 Research participants and data collection

The participants of this study were undergraduate students enrolled in English-Medium Instruction (EMI) courses at Chinese universities. According to the Ministry of Education of China's Joint Education Regulatory Information Platform, there are currently 289 universities in China offering EMI programs, with a total of 523 EMI programs and 263,900 undergraduate students¹. These students come from various disciplines, including science and

engineering, economics and management, medicine, and social sciences, and are typically aged between 18 and 25 years. These students' study in non-native English environments, using English as the primary language of instruction to complete academic learning tasks. While their English proficiency ranges from intermediate to advanced levels, all participants had completed at least one semester of EMI courses, ensuring sufficient EMI learning experience. During the period from 1 November 2024 to 1 December 2024, the study distributed electronic survey links via social media groups targeting EMI students, primarily through WeChat groups. A total of 480 valid responses were collected. According to the literature, the sample size should be at least five times the number of survey items (Bentler, 1987). Some studies recommend increasing this to ten times to improve precision (Kline, 2023; Tabachnick et al., 2013). Since the questionnaire used in this study contains 31 items, the collected sample size is sufficient for analysis.

3.2 Questionnaire design

To reduce participant fatigue and improve response quality, especially given the number and complexity of constructs involved, this study used shortened versions of validated scales. Previous research has shown that such abbreviated instruments can still yield high reliability and valid results when carefully adapted and tested for internal consistency (Öztaş and Erdoğan, 2024; Yoon et al., 2020). The Cronbach's α values for all constructs exceeded 0.70, indicating acceptable internal consistency. The questionnaire consisted of two parts:

¹ <https://www.crs.jsj.edu.cn/>

TABLE 1 Self-actualization items.

Item	References
SA1: I do not feel ashamed of any of my emotions.	Jones and Crandall (1986)
SA2: I am free to be angry with those I love.	
SA3: I can like people without having to approve of them.	
SA4: I feel that my life is meaningful.	
SA5: I am able to make decisions based on my own beliefs and values.	

- (1) Demographic Variables, including gender, year of study, major, and region, with four categorical variables.
- (2) Research Variables, covering self-actualization, language self-efficacy, internal locus of control, learning anxiety, and academic achievement.

3.2.1 Demographic variables

The demographic variables and their response options are as follows:

- (1) Gender: Male, Female,
- (2) Year of Study: Year 1, Year 2, Year 3, Year 4,
- (3) Region: Northeast China, North China, South China, East China, Northwest China,

3.2.2 Research variables

The items for the research variables were adapted from validated scales published in peer-reviewed journals and modified to fit the context of this study. All research variables were measured using a seven-point Likert scale, where 1 indicates “strongly disagree” and seven indicates “strongly agree” to reflect respondents’ level of agreement with each item.

3.2.2.1 Self-actualization (SA)

The Short Index of Self-Actualization (SISA) developed by Jones and Crandall (1986) was used to measure self-actualization. SISA, based on the well-known Personal Orientation Inventory (POI), has been validated for strong reliability and psychometric properties. Its concise design and widespread application make it highly suitable for large-sample survey research. This study selected this scale due to its empirically tested items, which are appropriate for investigating self-actualization among EMI students. A subset of original English items from SISA was adapted for this study, excluding reverse-coded items. Table 1 presents the items used to measure self-actualization. Although Jones and Crandall’s (1986) self-actualization scale was originally grounded in humanistic psychology, its core conceptual foundation continues to inform modern frameworks such as Self-Determination Theory and positive education (Sheldon et al., 2003). However, we acknowledge that the use of older frameworks may limit direct alignment with some contemporary theoretical models. This is addressed in the study’s limitations.

TABLE 2 Internal locus of control items.

Item	References
ILC1: when I get what I want, it is usually because I worked hard for it.	Duttweiler (1984)
ILC2: I am confident that I can deal effectively with unexpected problems.	
ILC3: I believe that my life is determined by my own actions.	
ILC4: I am able to do things as well as most other people.	
ILC5: my decisions are usually not influenced by what everyone else is doing.	

TABLE 3 Learning anxiety items.

Item	References
LA1: I worry about whether my performance in learning will meet expectations.	Cassady and Finch (2014)
LA2: I often feel tense and uneasy during the learning process.	
LA3: I am concerned that others will perform better than me in learning.	
LA4: even when I am well-prepared for learning, I still feel anxious.	
LA5: I worry that I will forget what I have learned during the learning process.	

3.2.2.2 Internal locus of control (ICI)

The Internal Control Index (ICI), developed by Duttweiler (1984), provides a set of Likert-scale items designed to measure an individual’s internal locus of control. The scale has been validated for reliability and validity, making it particularly suitable for research on self-efficacy and control beliefs. This study selected the ICI because it effectively captures students’ beliefs about internal control in learning, aligning with the focus on EMI students’ learning self-efficacy. Based on the study context, five items were designed, as shown in Table 2.

3.2.2.3 Learning anxiety (LA)

Based on the research by Cassady and Finch (2014), the Cognitive Test Anxiety Scale (CTAS) was developed and validated to measure learning anxiety in academic contexts. The scale provides a set of Likert-scale items with demonstrated reliability and validity, making it suitable for studies on anxiety in academic settings. Its structural validity and internal consistency have been verified, making it particularly effective for measuring anxiety in learning environments. This study selected the CTAS as a reference due to its high relevance to the anxiety experiences of EMI students during their learning process. Five items were designed for this study, as shown in Table 3.

3.2.2.4 Language self-efficacy (LSE)

Based on the research by Wang et al. (2014), the Questionnaire of English Self-Efficacy was developed to measure the self-efficacy of Chinese university students in English learning. This scale demonstrates strong reliability and validity and has been widely used to assess self-efficacy among English learners. It provides a

TABLE 4 Language self-efficacy items.

Item	References
LSE1: I can understand English lectures without difficulty.	Wang et al. (2014)
LSE2: I can read and understand academic texts in English easily.	
LSE3: I feel confident speaking English in class discussions.	
LSE4: I am able to write academic papers in English without much help.	
LSE5: I can effectively communicate with native English speakers.	

TABLE 5 Academic achievement items.

Item	References
AA1: I feel motivated to achieve academic success.	Richardson et al. (2012)
AA2: I am able to manage stress related to academic tasks effectively.	
AA3: I feel confident in my academic abilities.	
AA4: I set specific academic goals for myself.	
AA5: I can maintain my focus during study sessions.	
AA6: I believe that my efforts will lead to positive academic outcomes.	
AA7: I consistently prepare and study for my classes and exams.	

culturally adaptive and psychometrically robust tool specifically tailored for Chinese English learners. Given its high relevance and cultural adaptation, this scale aligns well with the needs of this study in assessing EMI students’ language self-efficacy. It is particularly suitable for evaluating students’ confidence in various language skills (listening, speaking, reading, and writing). The language self-efficacy items designed for this study are listed in Table 4.

3.2.2.5 Academic achievement (AA)

This study references Richardson et al. (2012) to design the Likert-scale items for measuring academic achievement. Richardson et al.’s systematic review and meta-analysis analyzed psychological correlates of academic achievement among university students, covering variables such as learning motivation, learning strategies, self-efficacy, and academic stress management. This authoritative research provides a solid theoretical foundation for designing psychometric items related to academic achievement. In this study, key constructs such as motivation, stress management, self-efficacy, focus, and goal setting were adopted to capture different dimensions of academic performance. Seven items were designed, as shown in Table 5.

3.3 Data analysis

This study employed Structural Equation Modeling (SEM) to examine the interrelationships among key psychological and educational constructs. SEM was chosen for its ability to assess

TABLE 6 Analysis of demographic data.

Category	Group	Frequency	Percentage (%)
Gender	Male	227	37.0
	Female	387	63.0
Year of study	Year 1	248	40.4
	Year 2	125	20.4
	Year 3	121	19.7
	Year 4	120	19.5
Region	Northeast China	188	30.6
	North China	123	20.0
	South China	116	18.9
	East China	94	15.3
	Northwest China	93	15.1

both direct and indirect pathways in a multivariate framework, making it suitable for the complexity of the hypothesized model. SPSS 24.0 and SmartPLS 4.0 are used as the primary analytical tools. The analysis is conducted in three stages. First, descriptive statistical analysis is performed using SPSS 24.0 to calculate frequency distributions and central tendencies, providing an overview of the sample data. Second, measurement model analysis is conducted with SmartPLS 4.0 to evaluate reliability and validity. Internal consistency is assessed through Cronbach’s α and composite reliability (CR), convergent validity is examined using Average Variance Extracted (AVE) and factor loadings, and discriminant validity is verified using the Fornell-Larcker criterion. Finally, structural model analysis is carried out to assess the model’s goodness of fit and test the significance of hypotheses through path analysis. The explanatory power of the model is evaluated using the coefficient of determination (R^2), and bootstrap resampling is employed to analyze mediation effects and confirm the significance of paths. This three-stage approach ensures the reliability, validity, and explanatory strength of the study, providing robust empirical evidence.

4 Research results

4.1 Analysis of demographic characteristics

The sample distribution in terms of gender, year of study, and region demonstrates specific characteristics. In terms of gender, females constitute 63.0% of the sample, while males account for 37.0%, indicating a female-dominated sample. Regarding the year of study, first-year students represent the largest proportion at 40.4%, with the remaining years (2nd to 4th) distributed relatively evenly, each accounting for approximately 19%–20%. In terms of regional distribution, the Northeast region has the highest sample proportion at 30.6%, followed by North China (20.0%) and South China (18.9%). The East and Northwest regions have similar proportions, each at approximately 15%. These distribution

characteristics provide a diverse sample base for this study, facilitating further empirical analysis. Table 6 provides a detailed summary of the demographic data.

4.2 Convergent validity

According to Fornell and Larcker (1981), Nunnally (1978), the criteria for evaluating the validity of a measurement model include the following: factor loadings should exceed 0.7, composite reliability (CR) should be greater than 0.7, average variance extracted (AVE) should exceed 0.5, and Cronbach’s α should be greater than 0.7.

The statistical analysis of this study reveals the following:

Factor loadings for all dimensions range from 0.706 to 0.943, exceeding the threshold of 0.7.

Composite reliability (CR) for all dimensions ranges from 0.909 to 0.949, exceeding the threshold of 0.7.

Average variance extracted (AVE) ranges from 0.668 to 0.790, exceeding the threshold of 0.5.

Cronbach’s α values for the dimensions range from 0.875 to 0.933, exceeding the threshold of 0.7.

These results indicate that the measurement model demonstrates excellent convergent validity. Table 7 provides detailed results of the convergent validity analysis.

4.3 Discriminant validity

This study assesses the discriminant validity of reflective constructs using the square root of the Average Variance Extracted (AVE) method. According to Fornell and Larcker (1981), discriminant validity is achieved when the square root of the AVE

TABLE 7 Convergent validity analysis.

Construct	Item	Factor loading	Cronbach’s alpha	Composite reliability (CR)	Average variance extracted (AVE)
Academic achievement	AA1	0.805	0.922	0.937	0.682
	AA2	0.843	–	–	–
	AA3	0.888	–	–	–
	AA4	0.833	–	–	–
	AA5	0.797	–	–	–
	AA6	0.806	–	–	–
	AA7	0.804	–	–	–
Internal locus of control	ILC1	0.831	0.879	0.912	0.676
	ILC2	0.876	–	–	–
	ILC3	0.848	–	–	–
	ILC4	0.841	–	–	–
	ILC5	0.704	–	–	–
Learning anxiety	LA1	0.706	0.875	0.909	0.668
	LA2	0.925	–	–	–
	LA3	0.785	–	–	–
	LA4	0.883	–	–	–
	LA5	0.768	–	–	–
Language self-efficacy	LSE1	0.876	0.921	0.940	0.760
	LSE2	0.901	–	–	–
	LSE3	0.849	–	–	–
	LSE4	0.865	–	–	–
	LSE5	0.866	–	–	–
Self-actualization	SA1	0.863	0.933	0.949	0.790
	SA2	0.885	–	–	–
	SA3	0.907	–	–	–
	SA4	0.943	–	–	–
	SA5	0.843	–	–	–

TABLE 8 Discriminant validity analysis.

	Academic achievement	Internal locus of control	language Self efficacy	Learning anxiety	Self actualization
Academic achievement	0.826	–	–	–	–
Internal locus of control	0.665	0.822	–	–	–
Language self efficacy	0.509	0.298	0.872	–	–
Learning anxiety	–0.294	–0.178	–0.252	0.817	–
Self actualization	0.494	0.556	0.145	–0.234	0.889

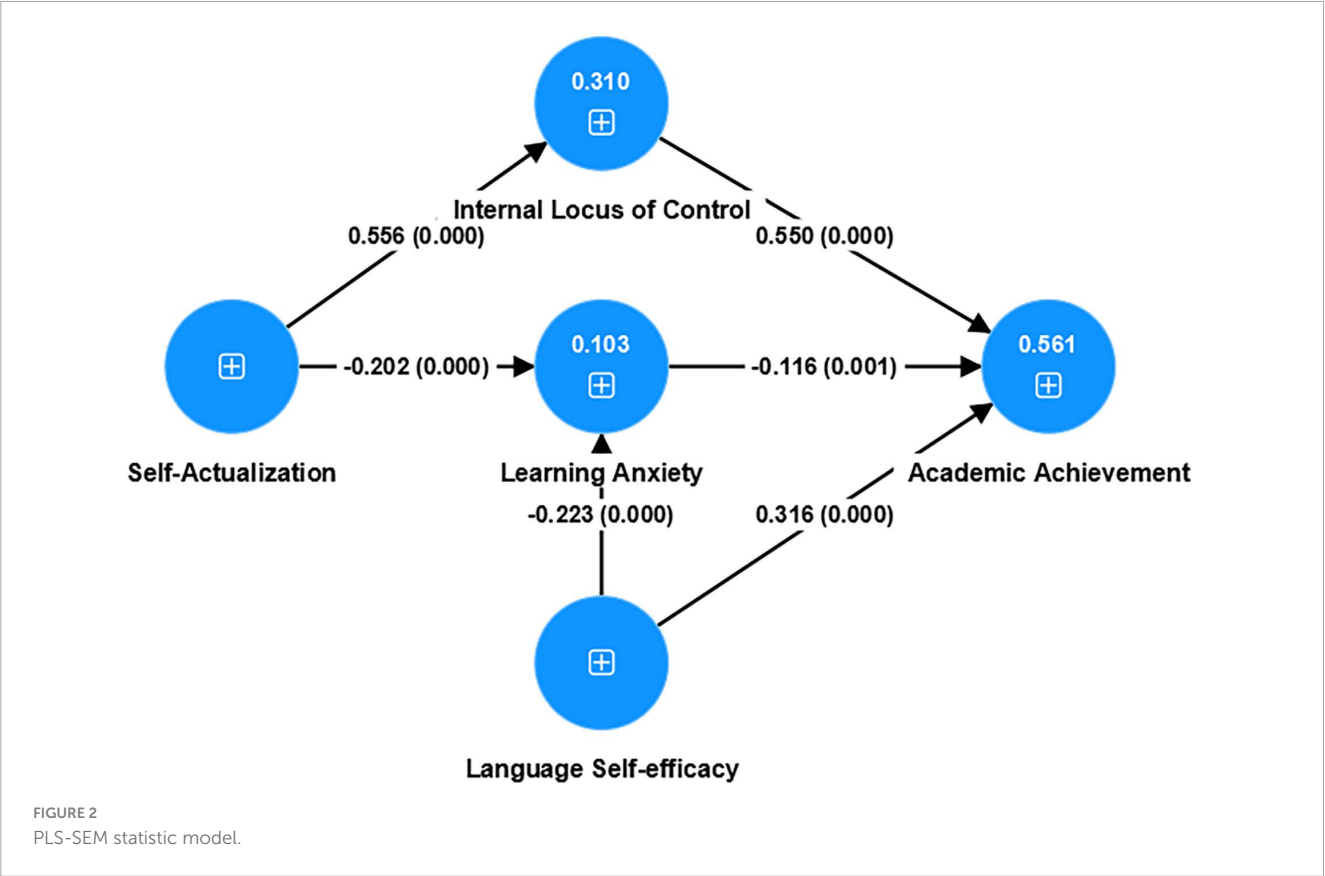


TABLE 9 Path analysis results.

Path	Path coefficient	Standard deviation	t value	P-value
H1: self-actualization → internal locus of control	0.556	0.050	11.097	0.000
H2: self-actualization → learning anxiety	–0.202	0.046	4.336	0.000
H3: language self-efficacy → learning anxiety	–0.223	0.047	4.698	0.000
H4: internal locus of control → academic achievement	0.550	0.037	14.751	0.000
H5: learning anxiety → academic achievement	–0.116	0.035	3.363	0.001
H6: language self-efficacy → academic achievement	0.316	0.034	9.295	0.000

for each construct is greater than the correlations between that construct and all other constructs.

The analysis results indicate that, for most constructs, the square root of the AVE values exceeds the correlations with other constructs. This satisfies the requirements for discriminant validity, suggesting that the reflective constructs in this study are sufficiently distinct from one another. This demonstrates that the constructs effectively differentiate between different concepts, confirming good discriminant validity for the study. Table 8 presents the detailed results of the discriminant validity analysis.

TABLE 10 Mediation effects analysis.

Path	Path coefficient	Standard deviation	t value	P-value	2.50%	97.50%
Language self-efficacy → learning anxiety → academic achievement	0.026	0.010	2.678	0.007	0.009	0.047
Self-actualization → learning anxiety → academic achievement	0.023	0.009	2.572	0.010	0.008	0.043
Self-actualization → internal locus of control → academic achievement	0.306	0.040	7.615	0.000	0.232	0.388

4.4 Model fit

The Goodness of Fit (GOF) is calculated using the formula:

$$GOF = \sqrt{AVE} \times \sqrt{R^2}.$$

According to [Vinzzi et al. \(2010\)](#), GOF values are interpreted as follows:

- 0.1: Weak fit
- 0.25: Moderate fit
- 0.36: Strong fit

The GOF value for this study is 0.482, indicating a strong fit of the model. This demonstrates that the measurement and structural models have excellent explanatory power and validity.

$$GOF = \sqrt{AVE} \times \sqrt{R^2} = \sqrt{0.715 \times 0.325} = 0.482$$

4.5 Path analysis

The path analysis results indicate the significance and strength of the relationships among the constructs, as shown in [Figure 2](#) and [Table 9](#). Detailed results are presented below:

Internal Locus of Control → Academic Achievement: Path coefficient = 0.550, Standard deviation = 0.037, t-value = 14.751, p-value = 0.000 (< 0.05). Conclusion: Internal Locus of Control has a significant positive effect on Academic Achievement.

Language Self-Efficacy → Academic Achievement: Path coefficient = 0.316, Standard deviation = 0.034, t-value = 9.295, p-value = 0.000 (< 0.05). Conclusion: Language Self-Efficacy has a significant positive effect on Academic Achievement.

Language Self-Efficacy → Learning Anxiety: Path coefficient = -0.223, Standard deviation = 0.047, t-value = 4.698, p-value = 0.000 (< 0.05). Conclusion: Language Self-Efficacy has a significant negative effect on Learning Anxiety.

Learning Anxiety → Academic Achievement: Path coefficient = -0.116, Standard deviation = 0.035, t-value = 3.363, p-value = 0.001 (< 0.05). Conclusion: Learning Anxiety has a significant negative effect on Academic Achievement.

Self-Actualization → Internal Locus of Control: Path coefficient = 0.556, Standard deviation = 0.050, t-value = 11.097, p-value = 0.000 (< 0.05). Conclusion: Self-Actualization has a significant positive effect on Internal Locus of Control.

Self-Actualization → Learning Anxiety: Path coefficient = -0.202, Standard deviation = 0.046, t-value = 4.336, p-value = 0.000 (< 0.05). Conclusion: Self-Actualization has a significant negative effect on Learning Anxiety.

4.6 Mediation effects

The mediation analysis results demonstrate that the indirect effects of certain paths are significant, as the p-values are below 0.05, and the confidence intervals (CIs) do not include 0. The findings are detailed as follows:

Language Self-Efficacy → Learning Anxiety → Academic Achievement: p-value < 0.05, confidence interval (0.009, 0.047). Conclusion: The mediation effect is significant.

Self-Actualization → Learning Anxiety → Academic Achievement: p-value < 0.05, confidence interval (0.008, 0.043). Conclusion: The mediation effect is significant.

Self-Actualization → Internal Locus of Control → Academic Achievement, p-value < 0.05, confidence interval (0.232, 0.388). Conclusion: The mediation effect is significant.

[Table 10](#) shows the results of mediation effects analysis.

5 Conclusion and discussion

5.1 Research conclusion

5.1.1 The impact of self-actualization on internal locus of control and learning anxiety

Self-actualization has a significant positive impact on the internal locus of control. This indicates that students with higher levels of self-actualization are more likely to feel a sense of control over their learning and life, believing that their efforts and abilities are the key factors in achieving their goals. The results align with previous literature. [Karnes and McGinnis \(1996\)](#) highlighted that individuals with a high degree of self-actualization often attribute success to their abilities and efforts rather than external factors. This enhanced sense of internal control encourages them to face challenges more proactively. Similarly, the study by [Engqvist Jonsson and Nilsson \(2014\)](#) demonstrated that value-driven and goal-oriented behaviors are characteristic of individuals with high self-actualization, further supporting the conclusions of this study.

The findings of this study indicate that self-actualization has a significant negative impact on learning anxiety. This result supports hypothesis H2, which posits that higher levels of self-actualization are associated with lower levels of learning anxiety. The results demonstrate that self-actualization effectively helps individuals reduce their fear of academic failure and enhances their ability to cope with stressful situations, thereby alleviating learning anxiety.

These findings are consistent with several previous studies. [Kang and Kim \(2021\)](#) noted that individuals with high self-actualization are more capable of embracing challenges and

focusing on self-growth, which reduces their sensitivity to external pressures and helps lower learning anxiety. Similarly, [Mohamadi et al. \(2014\)](#) emphasized that self-actualization enhances emotional regulation abilities, enabling students to approach academic stressors more positively. Additionally, [Shang \(2024\)](#) highlighted that self-actualization strengthens individuals' psychological resilience, reduces stress responses, and consequently alleviates anxiety.

In this study, the path coefficient (-0.202) indicates a significant negative impact, though the effect size is slightly lower than that reported in some prior studies. This discrepancy may be attributed to the unique characteristics of the participants, who were students in an English as a Medium of Instruction (EMI) environment. Their language learning pressure may be higher than that of students in general learning contexts, which could partially offset the moderating effect of self-actualization on learning anxiety. Moreover, [Huang and Mayer \(2019\)](#) suggested that the anxiety-reducing effect of self-actualization is particularly pronounced in language learning contexts. However, when students face multiple academic and language-related pressures simultaneously, the effect may be diminished.

The findings of this study reveal that the impact of self-actualization on the internal locus of control is significantly stronger than its impact on learning anxiety. This may be because the internal locus of control is a psychological trait closely associated with self-actualization. Self-actualization enhances individuals' proactive pursuit of goals, which directly strengthens their sense of internal control ([Karnes and McGinnis, 1996](#)). In contrast, learning anxiety is influenced by multiple factors, such as language proficiency and academic pressure, and the indirect impact of self-actualization may be weaker. Students in EMI (English as a Medium of Instruction) environments face dual pressures: language challenges and academic demands. While high self-actualization can help students cope with stress, language-related learning anxiety—such as communication and test anxiety—may require more direct language support ([Huang and Mayer, 2019](#)). This limits the role of self-actualization in mitigating learning anxiety.

The internal locus of control is a stable personal trait, whereas learning anxiety is an emotional response. Self-actualization, as a long-term pursuit of personal goals and values, is more likely to influence stable psychological characteristics like the internal locus of control. In contrast, its direct alleviating effect on short-term emotional states such as learning anxiety is relatively limited. The core role of self-actualization lies in stimulating intrinsic motivation and goal-directed behavior ([Engqvist Jonsson and Nilsson, 2014](#)). Thus, its effect on enhancing the internal locus of control is significant, as the internal locus of control essentially represents an individual's subjective assessment of control. Conversely, the mechanism by which self-actualization alleviates learning anxiety relies more on indirect pathways, such as improving emotional regulation or self-confidence ([Mohamadi et al., 2014](#)).

5.1.2 The impact of internal locus of control and learning anxiety on academic achievement

The results of this study indicate that the internal locus of control has a significant positive impact on academic achievement.

This suggests that students with a higher internal locus of control are more likely to adopt effective learning strategies and engage in positive learning behaviors, thereby improving their academic performance. These findings align closely with prior research. [Dubey and Nayyar \(2016\)](#) highlighted that students with a strong internal locus of control are more inclined to attribute academic success to their efforts and abilities. This attribution style fosters greater learning motivation and drive for action. Furthermore, [Albert and Dahling \(2016\)](#) found that the combination of an internal locus of control with traits like grit and confidence enables students to stay focused and effective when facing academic challenges, ultimately enhancing their academic achievements. Similarly, [Kumaravelu \(2018\)](#) demonstrated that an enhanced sense of internal control is significantly correlated with academic performance in challenging subjects such as science and mathematics, consistent with the findings of this study. The path coefficient observed in this research closely matches [Kumaravelu \(2018\)](#) findings, suggesting the stability of the impact of internal locus of control on academic achievement, particularly in demanding academic environments.

The findings of this study indicate that learning anxiety has a significant negative impact on academic achievement. This suggests that as students' levels of learning anxiety increase, their academic performance may decline due to factors such as distracted attention, impaired learning strategies, and heightened emotional burden. These results are consistent with existing literature. [Scarborough et al. \(1961\)](#) pointed out that learning anxiety interferes with students' focus and problem-solving abilities, thereby weakening academic performance. [Kang and Kim \(2021\)](#) emphasized that learning anxiety leads students to adopt more passive learning strategies, such as avoiding complex tasks or shortening study time, further reducing learning efficiency. Additionally, [Commodari and La Rosa \(2021\)](#) found that learning anxiety significantly affects subject-specific academic performance, such as the direct impact of math anxiety on students' mathematics grades. The data from this study further corroborate this conclusion, showing that even overall academic performance is negatively influenced by learning anxiety.

The impact of the internal locus of control is significantly stronger than that of learning anxiety. This finding indicates that, as a positive psychological variable, the internal locus of control has a more direct and substantial influence on academic achievement, whereas the negative impact of learning anxiety is relatively limited. The association between the internal locus of control and academic achievement primarily stems from the enhancement of individual agency. Students with a high internal locus of control believe that their efforts and abilities determine academic outcomes. This belief directly stimulates proactive learning behaviors and goal-oriented actions ([Albert and Dahling, 2016](#); [Dubey and Nayyar, 2016](#)). Moreover, the internal locus of control fosters persistence and learning motivation, thereby promoting academic success. Learning anxiety, as a negative emotional variable, may have its impact on academic achievement moderated by various factors. For instance, some students, despite high levels of anxiety, are able to offset its adverse effects through high self-efficacy in language learning or other support systems, such as teacher guidance ([Commodari and La Rosa, 2021](#)). Furthermore, academic achievement is influenced by a wide range of factors, including

learning strategies and interest in specific subjects, which may dilute the effects of learning anxiety.

5.1.3 The impact of language self-efficacy on learning anxiety and academic achievement

The findings of this study indicate that language self-efficacy has a significant impact on both learning anxiety and academic achievement. Language self-efficacy has a significant negative impact on learning anxiety, supporting hypothesis H3, which states that higher language self-efficacy reduces students' learning anxiety. Additionally, language self-efficacy has a significant positive impact on academic achievement, supporting hypothesis H6, which posits that higher language self-efficacy enhances students' academic performance. The negative impact of language self-efficacy on learning anxiety is consistent with existing literature. Zhao (2022) noted that learners with higher self-efficacy have greater confidence in coping with language learning challenges, thereby reducing foreign language anxiety. Moreover, Lin (2022) confirmed a significant negative correlation between language self-efficacy and learning anxiety. The empirical results of this study reaffirm this perspective, showing that language self-efficacy alleviates anxiety during the learning process by enhancing students' confidence.

The positive impact of language self-efficacy on academic achievement is also consistent with prior research. For instance, Mills et al. (2007) found that language self-efficacy helps students adopt more effective learning strategies and improves emotional regulation during learning. Similarly, Liu et al. (2020) emphasized that language self-efficacy has a more significant influence on academic achievement than learning strategies. These findings suggest that language self-efficacy promotes students' academic performance by enhancing learning motivation, strategy application, and emotional regulation.

5.1.4 Mediating effects of internal locus of control and learning anxiety

This study verified the mediating effects of internal locus of control and learning anxiety in the relationships between self-actualization, language self-efficacy, and academic achievement, revealing the underlying mechanisms. The findings support the proposed hypotheses and are consistent with conclusions from relevant literature.

The results show that self-actualization significantly influences academic achievement through internal locus of control. This mediating effect highlights the crucial role of internal locus of control in transforming self-actualization into academic success. Self-actualization enhances students' intrinsic motivation toward academic goals, thereby promoting their sense of internal control. Karnes and McGinnis (1996) pointed out that students with high levels of self-actualization are more likely to actively pursue goals and believe they can control outcomes. Albert and Dahling (2016) also emphasized that internal locus of control enhances students' perseverance and learning motivation, further driving academic success.

The results also indicate that self-actualization significantly impacts academic achievement through learning anxiety, with a negative indirect effect. This finding suggests that higher levels of self-actualization reduce students' learning anxiety, thereby improving academic performance. Students with high self-actualization are better equipped to handle academic challenges,

effectively manage stress, and reduce learning anxiety. Morosanova and Fomina (2017) noted that students with low self-actualization are more prone to learning anxiety, which undermines their focus and confidence, further lowering academic achievement. Pintrich and De Groot (1990) also highlighted that learning anxiety impedes students' active engagement in cognitively demanding learning tasks, negatively affecting academic performance.

Language self-efficacy has a significant negative indirect effect on academic achievement through learning anxiety. Students with higher language self-efficacy exhibit greater confidence in language learning, which helps reduce anxiety caused by language challenges and subsequently enhances academic performance. Zhao (2022) noted that learners with high language self-efficacy are better able to cope with the challenges of language learning, thereby reducing foreign language anxiety. Mills et al. (2007) found that language self-efficacy enhances students' control over learning tasks and their emotional regulation abilities, further promoting academic success. Similarly, Safran et al. (2022) confirmed that language self-efficacy alleviates learning anxiety and indirectly improves students' academic performance.

Among the three mediating effects examined in this study, the pathway from self-actualization → internal locus of control → academic achievement demonstrates the strongest impact. This indicates that internal locus of control, as a stable psychological trait, plays a more direct and enduring role in fostering academic success. Internal locus of control not only enhances students' proactive learning behaviors but also promotes resilience and adaptability in academic challenges.

In comparison, the influence of learning anxiety is relatively weaker, as it is moderated by external factors such as language proficiency and academic pressure, which may limit the indirect effects of self-actualization and language self-efficacy on academic performance. Finally, the pathway from language self-efficacy → learning anxiety → academic achievement is particularly effective in the context of language learning. This highlights the targeted role of language self-efficacy in reducing anxiety and improving performance among language learners.

5.2 Research discussion

5.2.1 Academic contributions

This study focuses on students in English as a Medium of Instruction (EMI) environments, addressing a gap in research on this specific learning group. EMI students face dual pressures: the challenges of language learning and academic demands, which distinguish their learning contexts from those of students in traditional learning environments. The findings shed light on the impact of self-actualization, language self-efficacy, internal locus of control, and learning anxiety on academic achievement within this group, providing a valuable reference for future research.

This study enriches the theoretical framework surrounding internal locus of control and learning anxiety while deepening the understanding of how self-actualization and language self-efficacy influence academic achievement. The results demonstrate that self-actualization not only directly affects internal locus of control but also indirectly impacts academic achievement through internal locus of control and learning anxiety. Furthermore, the study

highlights the critical role of language self-efficacy in alleviating learning anxiety and confirms its indirect effects on academic achievement, extending the applicability of theories related to language learning motivation and efficacy.

The findings emphasize the interconnected roles of psychological variables (e.g., internal locus of control and self-efficacy) and emotional variables (e.g., learning anxiety) in shaping academic achievement. This provides a more comprehensive explanatory framework for understanding the mechanisms underlying academic performance in complex learning contexts.

This study systematically revealed the mechanisms among constructs through a multiple mediation model. Among the pathways, the self-actualization → internal locus of control → academic achievement route demonstrated the strongest impact, highlighting that internal locus of control, as a stable psychological trait, serves as a crucial driver of academic success. The study emphasizes the essential role of internal locus of control in fostering learning motivation and regulating learning behaviors. Secondly, the self-actualization → learning anxiety → academic achievement pathway shows that self-actualization can indirectly enhance academic achievement by reducing learning anxiety. However, its influence is relatively weaker, suggesting that the effects of emotional variables are moderated by external factors. This research enriches theoretical discussions regarding learning anxiety as a negative emotional mediator. Finally, the language self-efficacy → learning anxiety → academic achievement pathway provides targeted contributions in language learning contexts. It demonstrates that language self-efficacy helps students effectively cope with the pressures of language learning, thereby improving their academic performance. The study further validates the positive role of language self-efficacy in boosting learners' confidence and emotional regulation capabilities.

5.2.2 Practical contributions

Based on the conclusions of this study, the following practical recommendations are provided for educational institutions, teachers, and policymakers:

5.2.2.1 Enhance students' internal locus of control

Internal locus of control is a core driver of academic achievement. Educational institutions should design targeted interventions to cultivate students' autonomy and intrinsic motivation. Guide students in setting specific academic goals while emphasizing the importance of effort and ability in achieving success. Through professional counseling or classroom activities, help students attribute academic success to their efforts and strategies rather than external factors. Provide students with opportunities to practice facing challenges in a controlled setting to strengthen their ability to cope with learning difficulties and boost their confidence.

5.2.2.2 Reduce learning anxiety and improve emotional regulation

Learning anxiety is a significant emotional barrier to academic success, especially in English as a Medium of Instruction (EMI) environments. Practical measures include. Establish professional counseling services to provide targeted support for students experiencing learning anxiety. Introduce mindfulness exercises, deep breathing, and other methods to help students stay calm under

pressure. Reduce students' fear of making mistakes by offering non-evaluative learning experiences such as group discussions and mock tests. These approaches allow students to improve their learning outcomes in a less stressful environment.

5.2.2.3 Improve language self-efficacy to address EMI challenges

Language self-efficacy significantly reduces language learning anxiety and enhances academic achievement. Suggestions include. Implement initiatives such as language skill enhancement courses or one-on-one tutoring to help students build a strong foundation in language proficiency. Encourage students to engage in simulated speeches, role-playing, and collaborative learning activities to strengthen their practical language skills. Offer constructive feedback and recognize students' progress in language learning to build their confidence and sense of achievement.

5.2.2.4 Leverage AI and hybrid learning to support emotional and cognitive development

Educators in EMI settings are encouraged to adopt generative AI tools and hybrid learning designs to support students' psychological needs. Research shows that these tools reduce language anxiety, enhance self-efficacy, and stabilize emotional states during learning (Lo, 2023; Lo et al., 2025). Practical strategies include incorporating AI-assisted writing platforms, facilitating synchronous/asynchronous interaction, and designing emotionally supportive course structures.

These findings are reinforced by recent models in educational psychology. The "emotional bridge" framework underscores the importance of emotionally stable hybrid learning environments (Lo, 2023), while studies on generative AI emphasize its role in boosting self-efficacy and reducing anxiety (Lo et al., 2025). Together, these perspectives highlight how supportive technological and pedagogical designs can strengthen internal psychological resources, thereby improving academic outcomes in EMI contexts.

5.2.2.5 Pedagogical strategies to foster self-actualization and internal locus of control

Instructors in EMI classrooms can scaffold self-actualization by facilitating goal-setting tasks, reflective journaling, and value-based learning activities that encourage intrinsic motivation. To develop students' internal locus of control, educators may implement autonomy-supportive teaching practices such as providing meaningful choices, promoting student-led inquiry, and emphasizing effort-based success. At the institutional level, programs such as learning strategy workshops, academic coaching, and metacognitive training modules can further reinforce students' belief in personal agency. These interventions not only align with our study's findings but also offer feasible pathways for enhancing academic engagement and achievement.

5.3 Research limitations and future research development

The sample in this study primarily consisted of students in English as a Medium of Instruction (EMI) environments, which may limit the generalizability of the findings. Students in other

learning contexts or cultural backgrounds may face different challenges, such as non-language-related learning pressures or culturally specific influences, potentially leading to different results. Therefore, the external validity of the study's conclusions requires further verification. This study focused on the effects of self-actualization, language self-efficacy, internal locus of control, and learning anxiety on academic achievement. It may have overlooked other significant psychological or emotional variables, such as achievement goal orientation, subject interest, or external support systems, that could influence academic performance. This limitation may prevent the research model from fully explaining the mechanisms affecting students' academic achievement.

Future research could expand the sample to include students from different disciplines, cultural backgrounds, and learning modes to enhance the generalizability of the findings. For example, comparisons with students in non-EMI environments or other language learners could help determine whether similar mechanisms or cultural differences exist. Future studies could also incorporate additional psychological and environmental variables, such as subject interest, achievement goal orientation, or teacher support, to enrich the research model and explore multiple pathways influencing academic achievement. Additionally, future research could examine the interactions between internal locus of control and other emotional variables, such as achievement anxiety or emotional exhaustion, to further explore the interplay of these factors.

Data availability statement

The datasets analyzed for this study can be found in the Zenodo repository, <https://doi.org/10.5281/zenodo.14562355>.

Ethics statement

Ethical approval was not required for the study involving humans in accordance with the local legislation and institutional requirements. Written informed consent to participate in this study was not required from the patients/ participants or the patients/ participants' legal guardians/next of kin in accordance with the national legislation and the institutional requirements.

Author contributions

YG: Conceptualization, Formal Analysis, Investigation, Methodology, Resources, Validation, Writing – original draft,

Writing – review and editing. LD: Conceptualization, Formal Analysis, Investigation, Methodology, Resources, Validation, Writing – original draft, Writing – review and editing. CY: Conceptualization, Formal Analysis, Investigation, Methodology, Resources, Validation, Writing – original draft, Writing – review and editing. H-LH: Conceptualization, Formal Analysis, Investigation, Methodology, Resources, Validation, Writing – original draft, Writing – review and editing.

Funding

The author(s) declare that no financial support was received for the research and/or publication of this article.

Conflict of interest

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

Generative AI statement

The authors declare that no Generative AI was used in the creation of this manuscript.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/feduc.2025.1567143/full#supplementary-material>

References

- Aizawa, I., and Rose, H. (2019). An analysis of Japan's English as medium of instruction initiatives within higher education: The gap between meso-level policy and micro-level practice. *High. Educ.* 77, 1125–1142. doi: 10.1007/s10734-018-0323-5
- Albert, M. A., and Dahling, J. J. (2016). Learning goal orientation and locus of control interact to predict academic self-concept and academic performance in college students. *Personal. Individ. Differ.* 97, 245–248. doi: 10.1016/j.paid.2016.03.074
- Ali, M. M., and Hamid, M. O. (2020). Teaching english to the test: Why does negative washback exist within secondary education in Bangladesh? *Lang. Assess. Quar.* 17, 129–146. doi: 10.1080/15434303.2020.1717495
- Bagherzadeh Ladari, R., Sadeghi, M. R., Haghshenas, M., Mousavi, S. E., and Yazdani Cherati, J. (2010). Study of the relationship between locus of control and academic achievement among students of Mazandaran University of Medical Sciences. *J. Mazandaran Univ. Med. Sci.* 20, 30–35.

- Bandura, A. (1997). *Self-efficacy the exercise of control*. New York, NY: H. Freeman & Co. Student Success.
- Bentler, P. (1987). Practical issues in structural modeling. *Sociol. Methods Res.* 16, 78–117. doi: 10.1177/0049124187016001004
- Bernacki, M. L., Nokes-Malach, T. J., and Alevén, V. (2015). Examining self-efficacy during learning: Variability and relations to behavior, performance, and learning. *Metacogn. Learn.* 10, 99–117. doi: 10.1007/s11409-014-9127-x
- Camacho-Morles, J., Slemp, G. R., Pekrun, R., Loderer, K., Hou, H., and Oades, L. G. (2021). Activity achievement emotions and academic performance: A meta-analysis. *Educ. Psychol. Rev.* 33, 1051–1095. doi: 10.1007/s10648-020-09585-3
- Carrillo-López, P. J., Constante-Amores, A., Arroyo-Resino, D., and Sánchez-Munilla, M. (2022). Self-concept and academic achievement in primary school: A predictive study. *Int. J. Educ. Math. Sci. Technol.* 10, 1057–1073. doi: 10.46328/ijemst.2303
- Cassady, J. C., and Finch, W. H. (2014). Confirming the factor structure of the cognitive test anxiety scale: Comparing the utility of three solutions. *Educ. Assess.* 19, 229–242. doi: 10.1080/10627197.2014.934604
- Commodari, E., and La Rosa, V. L. (2021). General academic anxiety and math anxiety in primary school. The impact of math anxiety on calculation skills. *Acta Psychol.* 220:103413. doi: 10.1016/j.actpsy.2021.103413
- Dang, T. K. A., Bonar, G., and Yao, J. (2023). Professional learning for educators teaching in English-medium-instruction in higher education: A systematic review. *Teach. High. Educ.* 28, 840–858. doi: 10.1080/13562517.2020.1863350
- Davidson, W. B., Bromfield, J. M., and Beck, H. P. (2007). Beneficial academic orientations and self-actualization of college students. *Psychol. Rep.* 100, 604–612. doi: 10.2466/pr0.100.2.604-612
- Dearden, J. (2014). *English as a medium of instruction: A growing global phenomenon: Phase 1*. Oxford: Department of Education, University of Oxford. Going Global 2014, Interim Report.
- Derakhshan, A., Greenier, V., and Fathi, J. (2023). Exploring the interplay between a loving pedagogy, creativity, and work engagement among EFL/ESL teachers: A multinational study. *Curr. Psychol.* 42, 22803–22822. doi: 10.1007/s12144-022-03371-w
- Dorer, H. L., and Mahoney, J. M. (2006). Self-actualization in the corporate hierarchy. *North Am. J. Psychol.* 8, 397–410.
- Dubey, A., and Nayyar, S. (2016). Role of locus of control in academic achievement of science students. *Int. J. Educ. Manag. Stud.* 6:416.
- Duttweiler, P. C. (1984). The internal control index: A newly developed measure of locus of control. *Educ. Psychol. Measur.* 44, 209–221. doi: 10.1177/0013164484442004
- Engqvist Jonsson, A.-K., and Nilsson, A. (2014). Exploring the relationship between values and pro-environmental behaviour: The influence of locus of control. *Environ. Values* 23, 297–314. doi: 10.3197/096327114X13947900181752
- Findley, M. J., and Cooper, H. M. (1983). Locus of control and academic achievement: A literature review. *J. Personal. Soc. Psychol.* 44, 419–427. doi: 10.1037/0022-3514.44.2.419
- Fornell, C., and Larcker, D. F. (1981). *Structural equation models with unobservable variables and measurement error: Algebra and statistics*. Los Angeles, CA: Sage Publications.
- Gopinath, R. (2020). Priorities of self-actualization among the academic leaders of Tamil Nadu universities with reference to demographic profile. *Asian J. Manag. Sci.* 9, 1–10. doi: 10.51983/ajms-2020.9.2.1643
- Hamid, M. O., Nguyen, H. T. M., and Baldauf, R. B. (2015). *Medium of instruction in Asia: Context, processes and outcomes*, vol. 14. Current Issues in Language Planning, 1–15. doi: 10.1080/14664208.2013.792130
- Heylighen, F. (1992). A cognitive-systemic reconstruction of Maslow's theory of self-actualization. *Behav. Sci.* 37, 39–58. doi: 10.1002/bs.3830370105
- Hu, G. (2009). The craze for English-medium education in China: Driving forces and looming consequences. *English Today* 25, 47–54. doi: 10.1017/S0266078409990472
- Hu, G., and Lei, J. (2014). English-medium instruction in Chinese higher education: A case study. *High. Educ.* 67, 551–567. doi: 10.1007/s10734-013-9661-5
- Huang, X., and Mayer, R. E. (2019). Adding self-efficacy features to an online statistics lesson. *J. Educ. Comput. Res.* 57, 1003–1037. doi: 10.1177/0735633118771085
- Ismailov, M., Chiu, T. K., Dearden, J., Yamamoto, Y., and Djalilova, N. (2021). Challenges to internationalisation of university programmes: A systematic thematic synthesis of qualitative research on learner-centred English Medium Instruction (EMI) pedagogy. *Sustainability* 13:12642. doi: 10.3390/su132212642
- Jablonkai, R. R., and Hou, J. (2023). English medium of instruction in Chinese higher education: A systematic mapping review of empirical research. *Appl. Linguist. Rev.* 14, 1483–1512. doi: 10.1515/applirev-2021-0179
- Jones, A., and Crandall, R. (1986). Validation of a short index of self-actualization. *Personal. Soc. Psychol. Bull.* 12, 63–73. doi: 10.1177/0146167286121007
- Kamaşak, R., and Sahan, K. (2023). Academic success in English medium courses: Exploring student challenges, opinions, language proficiency and L2 use. *RELJ* 55:00336882231167611. doi: 10.1177/00336882231167611
- Kang, J., and Kim, J. (2021). Learning effects according to the level of science state curiosity and science state anxiety evoked in science learning. *J. Kor. Assoc. Sci. Educ.* 41, 221–235.
- Karnes, F. A., and McGinnis, J. C. (1996). Self-actualization and locus of control with academically talented adolescents. *J. Secondary Gifted Educ.* 7, 369–372. doi: 10.1177/1932202X9600700204
- Kesavayuth, D., Poyago-Theotoky, J., and Zikos, V. (2020). Locus of control, health and healthcare utilization. *Econ. Modell.* 86, 227–238. doi: 10.1016/j.econmod.2019.06.014
- Kline, R. B. (2023). *Principles and practice of structural equation modeling*. New York, NY: Guilford publications.
- Kumaravelu, G. (2018). Locus of control in school students and its relationship with academic achievement. *J. School Educ. Technol.* 13, 63–66. doi: 10.26634/jsch.13.4.14545
- Kutuk, G., Putwain, D. W., Kaye, L. K., and Garrett, B. (2023). The development and preliminary validation of a new measure of self-efficacy: Questionnaire of self-efficacy in learning a foreign language. *ITL-Int. J. Appl. Linguist.* 174, 230–262. doi: 10.1075/itl.21031.kut
- Lasagabaster, D., and Fernández-Costales, A. (2024). “EMI language teacher education: A systematic review,” in *Handbook of language teacher education. Springer international handbooks of education*, eds Z. Tajeddin and T. S. Farrell (Cham: Springer).
- Li, G., Li, Z., Wu, X., and Zhen, R. (2022). Relations between class competition and primary school students' academic achievement: Learning anxiety and learning engagement as mediators. *Front. Psychol.* 13:775213. doi: 10.3389/fpsyg.2022.775213
- Lin, Q. (2022). Anxiety and self-efficacy in Chinese international students' L3 French learning with L2 English and L3 French. *Front. Psychol.* 13:998536. doi: 10.3389/fpsyg.2022.998536
- Liu, J., Peng, P., and Luo, L. (2020). The relation between family socioeconomic status and academic achievement in China: A meta-analysis. *Educ. Psychol. Rev.* 32, 49–76. doi: 10.1007/s10648-019-09494-0
- Lo, N. (2023). Emotional bridge in higher education: Enhancing self-efficacy and achievement through hybrid engagement. *ESP Rev.* 5, 7–23. doi: 10.23191/espkr.2023.5.2.7
- Lo, N., Wong, A., and Chan, S. (2025). The impact of generative AI on essay revisions and student engagement. *Comp. Educ. Open* 2025:100249. doi: 10.1016/j.caeo.2025.100249
- Macaro, E., Curle, S., Pun, J., An, J., and Dearden, J. (2018). A systematic review of English medium instruction in higher education. *Lang. Teach.* 51, 36–76. doi: 10.1017/S0261444817000350
- Mathur, R. (2014). Academic achievement of college students and their locus of control. *Int. J. Ind. Psychol.* 1, 78–83. doi: 10.25215/0103.008
- Mills, N., Pajares, F., and Herron, C. (2007). Self-efficacy of college intermediate French students: Relation to achievement and motivation. *Lang. Learn.* 57, 417–442. doi: 10.1111/j.1467-9922.2007.00421.x
- Mineka, S., and Oehlborg, K. (2008). The relevance of recent developments in classical conditioning to understanding the etiology and maintenance of anxiety disorders. *Acta Psychol.* 127, 567–580. doi: 10.1016/j.actpsy.2007.11.007
- Moghadari-Koosha, M., Moghadasi-Amiri, M., Cheraghi, F., Mozafari, H., Imani, B., and Zandieh, M. (2020). Self-efficacy, self-regulated learning, and motivation as factors influencing academic achievement among paramedical students: A correlation study. *J. Allied Health* 49, 145E–152E.
- Mohamadi, M., Alishahi, Z., and Soleimani, N. (2014). A study on test anxiety and its relationship to test score and self-actualization of academic EFL students in Iran. *Procedia-Soc. Behav. Sci.* 98, 1156–1164. doi: 10.1016/j.sbspro.2014.03.529
- Morosanova, V., and Fomina, T. (2017). Self-regulation as a mediator in the relationship between anxiety and academic examination performance. *Procedia-Soc. Behav. Sci.* 237, 1066–1070. doi: 10.1016/j.sbspro.2017.02.156
- Ng, T. W., Sorensen, K. L., and Eby, L. T. (2006). Locus of control at work: A meta-analysis. *J. Organ. Behav.* 27, 1057–1087. doi: 10.1002/job.416
- Nunnally, J. C. (1978). “An overview of psychological measurement,” in *Clinical diagnosis of mental disorders*, ed. B. B. Wolman (Boston, MA: Springer).
- Onyekuru, B. U., and Ibegbunam, J. O. (2014). Relationships among test anxiety, locus of control and academic achievement among college students. *Eur. Sci. J.* 10, 387–401. doi: 10.19044/esj.2014.v10n13p387
- Ormzyar, N. I. M. (2023). The mediation role of student engagement between the influence of english language anxiety and academic achievement in higher education. *OTS Can. J.* 2, 13–28. doi: 10.58840/ots.v2i2.13
- Ortiz, F. A. (2020). Self-actualization in the Latino/Hispanic culture. *J. Human. Psychol.* 60, 418–435. doi: 10.1177/0022167817741785

- Öztaş, M., and Erdoğan, A. (2024). Adaptation of the personality traits scale of e-sports players to Turkish culture. *Int. J. Sport Exerc. Train. Sci.* 10, 299–306. doi: 10.18826/usecabd.1579595
- Peng, H.-H., Murti, A. T., Silitonga, L. M., and Wu, T.-T. (2023). Effects of the fundamental concepts of computational thinking on students' anxiety and motivation toward K-12 English writing. *Sustainability* 15:5855. doi: 10.3390/su15075855
- Peng, J.-E., and Xie, X. (2021). English-medium instruction as a pedagogical strategy for the sustainable development of EFL learners in the Chinese context: A meta-analysis of its effectiveness. *Sustainability* 13:5637. doi: 10.3390/su13105637
- Phillips, H. L. IV, Dong, T., Durning, S. J., and Artino, A. R. Jr. (2015). Assessing task importance and anxiety in medical school: An instrument development and initial validation study. *Milit. Med.* 180(Suppl._4), 31–42. doi: 10.7205/MILMED-D-14-00557
- Pintrich, P. R., and De Groot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *J. Educ. Psychol.* 82, 33–40. doi: 10.1037/0022-0663.82.1.33
- Pufal-Struzik, I. (1999). Self-actualization and other personality dimensions as predictors of mental health of intellectually gifted students. *Roeper Rev.* 22, 44–47. doi: 10.1080/02783199909553997
- Querol-Julian, M., and Crawford Camiciottoli, B. (2019). The impact of online technologies and English medium instruction on university lectures in international learning contexts: A systematic review. *ESP Today* 7, 2–23. doi: 10.18485/esptoday.2019.7.1.1
- Rahman, M. M., and Singh, M. K. M. (2022). The ideology towards English as a Medium of Instruction (EMI) adoption in higher education in Malaysia: A case study. *3L: Southeast Asian J. Eng. Lang. Stud.* 28, 109–121. doi: 10.17576/3L-2022-2802-08
- Richardson, M., Abraham, C., and Bond, R. (2012). Psychological correlates of university students' academic performance: A systematic review and meta-analysis. *Psychol. Bull.* 138:353. doi: 10.1037/a0026838
- Rose, H., Curle, S., Aizawa, I., and Thompson, G. (2020). What drives success in English medium taught courses? The interplay between language proficiency, academic skills, and motivation. *Stud. High. Educ.* 45, 2149–2161. doi: 10.1080/03075079.2019.1590690
- Safran, J. F., Gak, D. M., and Bulatovic, V. V. (2022). Anxiety and self-efficacy in esp learning: Effects on academic success. *Res. Pedagogy* 12, 447–460. doi: 10.5937/IstrPed2202447S
- Sanahuja Vélez, G., Ribes Giner, G., and Moya Clemente, I. (2020). "A systematic review of english as a medium of instruction in higher education institutions: The case of a business school," in *Internationalising learning in higher education*, ed. M. Carrió-Pastor (Cham: Palgrave Macmillan).
- Scarborough, O. R., Hindsman, E., and Hanna, G. (1961). Anxiety level and performance in school subjects. *Psychol. Rep.* 9, 425–430. doi: 10.2466/pr0.1961.9.2.425
- Shang, H. (2024). A study of English learning anxiety regulation strategies based on the deep learning model. *Appl. Mathem. Nonlinear Sci.* 9, 1–14. doi: 10.2478/amns.2023.1.00381
- Sheldon, K. M., Joiner, T. E. Jr., Pettit, J. W., and Williams, G. (2003). Reconciling humanistic ideals and scientific clinical practice. *Clin. Psychol. Sci. Pract.* 10:302. doi: 10.1093/clipsy.bpg026
- Shepard, C., and Rose, H. (2023). English medium higher education in Hong Kong: Linguistic challenges of local and non-local students. *Lang. Educ.* 37, 788–805. doi: 10.1080/09500782.2023.2240571
- Shepherd, S., Owen, D., Fitch, T. J., and Marshall, J. L. (2006). Locus of control and academic achievement in high school students. *Psychol. Rep.* 98, 318–322. doi: 10.2466/pr0.98.2.318-322
- Sujadi, E., and Aulianisya, L. (2020). Locus of control and student achievement. *Indones. J. Counsel. Dev.* 2, 52–58. doi: 10.32939/ijcd.v2i01.872
- Tabachnick, B. G., Fidell, L. S., and Ullman, J. B. (2013). *Using multivariate statistics*. Boston, MA: Pearson.
- Vinzi, V. E., Trinchera, L., and Amato, S. (2010). "PLS path modeling: From foundations to recent developments and open issues for model assessment and improvement" in *Handbook of partial least squares. springer handbooks of computational statistics*, eds V. Esposito Vinzi, W. Chin, J. Henseler, and H. Wang (Berlin: Springer), 47–82.
- Vitterso, J. (2004). Subjective well-being versus self-actualization: Using the flow-simplex to promote a conceptual clarification of subjective quality of life. *Soc. Indic. Res.* 65, 299–331. doi: 10.1023/B:SOCI.0000003910.26194.ef
- Wächter, B., and Maiworm, F. (2014). "Part I—the big picture," in *English-Taught programmes in european higher education: The state of play in 2014*, eds B. Wachter and F. Maiworm (Germany: Lemmens Medien).
- Wang, C., Kim, D.-H., Bai, R., and Hu, J. (2014). Psychometric properties of a self-efficacy scale for English language learners in China. *System* 44, 24–33. doi: 10.1016/j.system.2014.01.015
- Yoon, S., Kim, S. R., Kim, H. Y., Yoo, S.-H., and Choi, J. C. (2020). The reliability and validity of the Korean short version of the stroke-specific quality of life scale. *Rehabil. Nurs. J.* 45, 218–224. doi: 10.1097/rnj.0000000000000199
- Yüksel, D., Soruç, A., Horzum, B., and McKinley, J. (2023). Examining the role of English language proficiency, language learning anxiety, and self-regulation skills in EMI students' academic success. *Stud. Second Lang. Learn. Teach.* 13, 399–426. doi: 10.14746/ssl.38280
- Zhang, M., and Pladevall-Ballester, E. (2022). Students' attitudes and perceptions towards three EMI courses in mainland China. *Lang. Cult. Curriculum* 35, 200–216. doi: 10.1080/07908318.2021.1979576
- Zhao, H. (2022). A study on the correlation between psychological anxiety, self-efficacy and foreign language learning achievement. *Int. J. Neuropsychopharmacol.* 25(Suppl._1), A63–A64. doi: 10.1093/ijnp/pyac032.087