

Influence of Students Perceived Classroom Climate on English Language Learned Helplessness in China's Vocational Colleges: Mediation of Classroom Silence and Academic Self-Efficacy

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Abstract

In this study, we investigated the mediating effects of classroom silence and academic self-efficacy on the relationship between English classroom climate and learned helplessness among vocational college students. A total of 501 students from 5 postsecondary vocational colleges in Fujian Province, China, were assessed using the Classroom Climate Scale, Classroom Silence Scale, Learning Self-Efficacy Scale, and English Learned Helplessness Scale. Structural equation modelling was used to evaluate the mediating effects of classroom silence and academic self-efficacy on the relationship between classroom climate and learned helplessness. We found that perceived classroom climate negatively affected students' learned helplessness. In addition, classroom silence and academic self-efficacy fully mediated the relationship between perceived classroom climate and learned helplessness. This study provides relevant recommendations for educational administrators, English teachers, and students.

Keywords: academic self-efficacy, classroom climate, classroom silence, higher vocational students, learned helplessness

1. Introduction

1.1 Background

Market demand for skilled talent has increased with the development of the social economy and industrial restructuring. The vigorous promotion of vocational education has emerged as a crucial development strategy in China (Du et al., 2022). Postsecondary vocational education aims to help students become professionals with with in-demand global industry skills (Frady, 2022).

"Learned helplessness" constitutes a systemic problem in English classroom teaching in China and is especially prevalent among vocational college students with a weak foreign language foundation (Wang & Wang, 2020). Students who have experienced self-perceived failures in English learning may easily abandon even simple tasks, resulting in learned helplessness (Hassan, 2021; Leis, 2021). English classes in postsecondary vocational colleges provide students with a valuable communication platform. Teachers can create an engaging learning environment and foster various subject-specific interactions in English classes, which can stimulate the enthusiastic participation of students in class (Kalashnikova et al., 2019; Zhouyuan, 2016) and effectively reduce their learned helplessness (Ghasemi, 2021).

According to Bandura's (1982) self-efficacy theory (SET), the higher is an individual's academic self-efficacy, the lower is their level of helplessness; academic self-efficacy influences students' choices, social connections, and exerted effort. Therefore, individuals who believe that they can complete an activity demonstrate high self-efficacy when participating in that activity (Bandura, 1986). Classroom interaction is a vital component of the teaching process (Oga-Baldwin, 2019). Approximately 70% of all students in postsecondary vocational colleges in China remain silent (in terms of participation) in class (Chen & Lv, 2017). Students' reactions to the classroom environment or underlying psychological factors may result in classroom silence (Aubrey, King & Almkhaild, 2022; Jin, Zhang & MacIntyre, 2020; Damayanti & Listyani, 2020). Students who exhibit classroom silence are more likely to experience learned helplessness (Ghasemi, 2022).

Ryan and Deci (2012) proposed self-determination theory (SDT), which pertains to the motivations behind human behavior. This theory categorizes human motivation into three types—unmotivated, externally motivated, and internally motivated—and it explains the essence of human motivation in terms of internal psychological needs. SDT focuses on the direction of an individual's growth and inner psychological needs, which form the foundation of inner motivation and personality integration, and investigates the conditions that promote these positive processes (Ryan et al., 2021). According to Ryan and Deci (2000), the need for relationships (classroom climate), classroom silence, and appropriate educational material based on ability level (academic self-efficacy) can predict learning motivation, and students' lack of motivation manifests as learned helplessness.

This study empirically investigated the influence of classroom climate on the learned helplessness of Chinese college students learning English. In addition, we analyzed the mediating effects of classroom silence and academic self-efficacy on the relationship between English classroom climate and learned helplessness. Our findings may have practical applications for modern vocational English

education in China.

1.2 Classroom Climate and Learned Helplessness

Classroom climate is defined as the psychological, emotional, and social environment created by the interactions between teachers and students and among students in the classroom (Ferreira et al., 2020). A positive classroom climate promotes relaxed learning and can effectively reduce students' anxiety (Wang, 2020; DaLomba et al., 2021). Conversely, a negative classroom climate generates feelings of helplessness (Filippello et al., 2020). Teachers' supportive behaviors can help foster a positive classroom climate (Farmer et al., 2019; Teo & Pua, 2022; Zhang, 2019; Li, 2020). Controlling teachers, however, positively predict learned helplessness (Filippello et al., 2020). Studies have reported a negative relationship between the quality of the teacher–student relationship and learned helplessness (Ghasemi, 2021; Wu & Tu, 2019). Because students and teachers generally do not share a close relationship in postsecondary vocational colleges, students frequently feel undervalued (Yuan, 2022). Therefore, most students remain in a state of learned helplessness and avoid classroom participation, particularly in English classes (Chen & Lv, 2017). Students' sense of learned helplessness is persistent (Raufelder & Kulakow, 2022). The classroom climate can stimulate internal motivation if it satisfies students' needs for autonomy and relationships and provides appropriate educational materials based on ability level.

Therefore, this study analyzed the relationship between and the effect of learned helplessness on the English classroom climate of vocational college students and proposed the following hypothesis (Hypothesis 1):

English classroom climate would significantly contribute to the learned helplessness of vocational college students.

1.3 Classroom Climate, Classroom Silence, and Learned Helplessness

The classroom is composed of teachers and students (Vattøy & Gamlem, 2020; Cheng & Zheng, 2017). Classroom climate is closely associated with classroom silence among college students (Liu, 2021; Zhouyuan, 2016). Classroom climate influences students' enthusiasm for classroom participation (Dewaele & Li, 2021; Lu et al., 2016); a lively atmosphere encourages students to actively participate in class and fosters learning motivation (Li, 2020; Liu, 2021). Conversely, a dull classroom environment encourages negative attitudes and even antagonistic behaviors in students (Kaufmann, 2020; Li et al., 2022). Studies have revealed that a highly stressful classroom environment generates cautious behavior in students, culminating in classroom silence (Zhang, 2019). Students who exhibit a low learning initiative in the classroom may develop learned helplessness, which can manifest as classroom silence (Buzzaii et al., 2021). Dewaele (2019) discovered that English classroom silence was associated with foreign language learning anxiety. Students with high levels of anxiety are more likely to be silent in class than are other students; moreover, the level of learned helplessness is higher among students with high levels of anxiety than among other students.

This study focused on the relationship between classroom climate, classroom silence, and learned helplessness in vocational college students' English learning. The following hypothesis was proposed (Hypothesis 2): Classroom silence would mediate the relationship between perceived classroom climate and vocational college students' learned helplessness in English classroom.

1.4 Classroom Climate, Academic Self-Efficacy, and Learned Helplessness

A positive classroom climate fostered by teachers and students can substantially reduce students' anxiety and helplessness (Da Lomba et al., 2021). Bandura's (1995) SET states that academic self-efficacy and learned helplessness are negatively correlated. That is, the lower is an individual's academic self-efficacy level, the higher is their learned helplessness level, and the greater is their likelihood of experiencing anxiety and fear of failure. Studies involving non-English major college students have revealed that academic self-efficacy plays a vital intermediary role in the influence of emotional engagement in English learning on English academic achievement (Wu & Tu, 2019). Students that are emotionally involved participate more actively in class; students that are not emotionally involved may feel anxious, passive, and helpless. Bandura (1986) observed that students with low self-efficacy frequently had negative psychological states such as depression and anxiety. The classroom environment, teacher evaluation, peer evaluation, and negative emotions all contribute to language learning anxiety (Li et al., 2021). Positive interactions between teachers and students increase academic self-efficacy and decrease English learning anxiety and helplessness (Popa-Velea et al., 2021). Academic self-efficacy appears to mediate the relationship between classroom climate and learned helplessness.

Therefore, this study focused on the relationship between classroom climate, academic self-efficacy, and learned helplessness in the English classroom learning of vocational college students; the following hypothesis is proposed (Hypothesis 3): The self-efficacy of vocational college students would mediate the relationship between perceived classroom climate and the students' learned helplessness in English classroom.

2. Method

We constructed a hypothetical model (Figure 1) in accordance with the theoretical basis and purpose of this study and the findings obtained through literature review. Structural equation modeling is a multivariate statistical technique that combines factor analysis and path analysis. Its strength lies in the quantitative study of the interaction between multiple variables (Kline, 1998). Therefore, exploring the impact of students perceived classroom climate on the learned helplessness by using structural equation modeling and whether students perceived classroom climate affects learned helplessness through the mediation of classroom silence and academic self-efficacy, which is of great significance for the employment guidance of vocational college students, is required to provide a theoretical basis for educational managers' work.

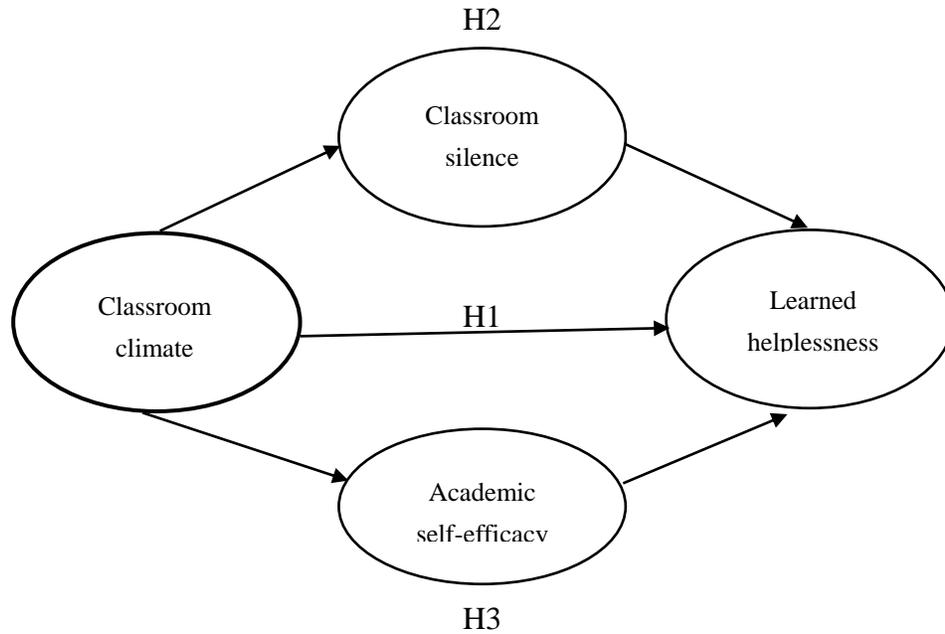


Figure 1. Proposed model

2.1 Participants and Procedures

The Institutional Review Committee of the International College of Krirk University approved this study, and all respondents provided informed consent. The research questionnaire was distributed through the online survey platform Questionnaire on October 23, 2022. This study guaranteed the anonymity of participants to encourage honest responses during the completion of questionnaires, and students were permitted to stop at any time. The questionnaire comprised 47 questions and was distributed to students at five postsecondary vocational colleges in Quanzhou, China. English is a requisite course in these selected postsecondary vocational schools. English majors must enroll in 10–11 hours of English classes per week, whereas students majoring in literature, history, science, or engineering must enroll in 1–2 hours per week of English classes. To ensure accurate and meaningful study results were obtained, only students enrolled in English classes during the current semester were eligible to complete the questionnaire. A total of 520 questionnaires were distributed. This study enrolled 501 vocational college students after questionnaires with missing responses and repetitive answer patterns were eliminated.

The questionnaire had a response rate of 96.35%. The participants comprised 232 men (46.3%) and 269 women (53.7%). Of the 501 students, 372 were freshmen, 89 were sophomores, and 40 were juniors. Among the questionnaire respondents, 18.2% of students majored in English, 57.3% majored in literature and history, and 24.6% majored in science and engineering.

2.2 Research Instrument

A. Classroom Climate Scale

This study implemented the Vocational College Students Classroom Climate Scale developed by Chao and Li (2018) and Hu Zixiang’s (2010) College Classroom Climate Evaluation Questionnaire; these tools were adapted in accordance with a review of the relevant literature. The Classroom Climate Scale for Vocational College Students is divided into the following four dimensions: teacher support, peer interaction, teaching innovations, and classroom order. The 14 total questions include three on the topic of teacher support, four on peer interaction, four on innovative teaching, and three on classroom order. The English classroom climate rating is based on a 5-point scale ranging from “completely consistent” to “completely inconsistent.” The composite reliability (CR) and average variance extracted (AVE) of the scale items ranged from .886 to .954 and from .722 to .837, respectively. Cronbach’s α values for all dimensions ranged from .885 to .953, and the Cronbach’s α coefficient for the total scale was .933, indicating good convergence validity (Dillon & Goldstein, 1984). In addition, the majority of the adaptation indexes, such as the chi-squared test (χ^2/df ; 3.171), the parsimonious normed fit index (PNFI; .754), the comparative fit index (CFI; .977), the incremental fit index (IFI; .977), the relative fit index (RFI; .958), and the root mean square error of approximation (RMSEA; .066), were statistically significant (Hair, 2009).

B. Classroom Silence Scale

This study implemented a subscale of the Scale on the Classroom Silence of Vocational College Students (Liu, 2020) to assess the level of negative silence in the classroom negative silence. The scale consists of eight questions on a single dimension. One unqualified question is removed from the pretest, leaving seven questions. Each question is assigned a point value ranging from “completely consistent” to “completely inconsistent,” with scores from 1 to 5. The items in the formal measurement table had CR values of .877 and .509, respectively. The scale’s Cronbach’s α coefficient of .877 indicated good convergence validity (Dillon & Goldstein, 1984). Furthermore, most of the adaptation indexes, including χ^2/df (3.028), the PNFI (.648), the CFI (.981), the IFI (.981), the RFI (.959), and the RMSEA

(.064), were statistically significant (Hair, 2009).

C. Academic Self-Efficacy Scale

Wu and Tu (2019) developed the Academic Self-Efficacy Scale, a one-dimensional scale used to assess vocational college students' self-evaluation of their ability to complete learning tasks. One unqualified question was removed during the preliminary test, leaving nine questions. Each question is based on a 5-point Likert-type scale ranging from "completely consistent" to "completely inconsistent,". The CR and AVE values of the items in the formal measurement table were .939 and .636, respectively, and the scale's Cronbach's α coefficient of .937 indicated good convergence validity (Dillon & Goldstein, 1984). In addition, the majority of the adaptation indexes, such as χ^2/df (3.340), the PNFI (.730), the CFI (.981), the IFI (.981), the RFI (.965), and the RMSEA (.070), indicated statistical significance (Hair, 2009).

D. Learned Helplessness Scale

In the present study, the Learned Helplessness Scale developed by Quinless and Nelson (1988) was modified based on expert opinions and the English learning characteristics of vocational college students in China. Three substandard questions were removed during the pretest; 17 questions remained, which included the following four dimensions: cognitive helplessness, emotional helplessness, behavioral helplessness, and attribution helplessness. The items were rated on a 5-point Likert-type scale with end points ranging from *completely consistent* to *completely inconsistent*. The CR and AVE values of the items in the formal measurement table ranged from .890 to .933 and from .684 to .730, respectively. Cronbach's α values for all dimensions ranged between .885 and .931, and the total scale's Cronbach's α coefficient of .955 indicated good convergence validity (Dillon & Goldstein, 1984). In addition, the majority of the adaptation indexes, such as χ^2/df (3.232), the PNFI (.789), the CFI (.965), the IFI (.965), the RFI (.940), and the RMSEA (.067), reached statistical significance (Hair, 2009).

3. Results

3.1 Main Effect

The main effects model is presented in Figure 2. Statistical significance was noted for most adaptation indexes, including χ^2/df (2.836), PNFI (.658), CFI (.980), IFI (.980), RFI (.956), and RMSEA (.061)(Hair, 2009). The classroom climate accounted for 9% of the variation in learned helplessness ($\beta = .313, p < .001$); this finding supports hypothesis 1, indicating that classroom climate significantly contributes to learned helplessness in college students.

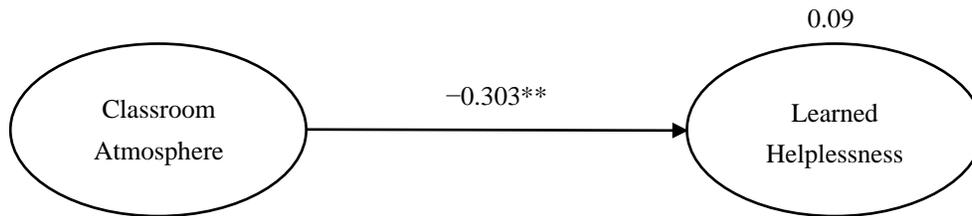


Figure 2. Main effect model

3.2 Mediation Model with Classroom Silence and Academic Self-Efficacy as Mediating Variables

Figure 3 presents a mediation model with classroom silence and academic self-efficacy as mediating variables. Statistical significance was observed for most adaptation indexes, including χ^2/df (2.540), PNFI (.820), CFI (.948), IFI (.948), RFI (.907), and RMSEA (.056) (Hair, 2009). In the structural model, the classroom climate accounted for 10% of the variation in classroom silence ($\beta = -.315, p < .001$) and 9% of the variation in perceived academic self-efficacy ($\beta = .303, p < .001$). Classroom silence ($\beta = .413, p < .001$) and perceived academic self-efficacy ($\beta = -.350, p < .001$) accounted for 37% of the variation in learned helplessness. Classroom climate had a nonsignificant effect on learned helplessness ($\beta = -.091, p > .05$).

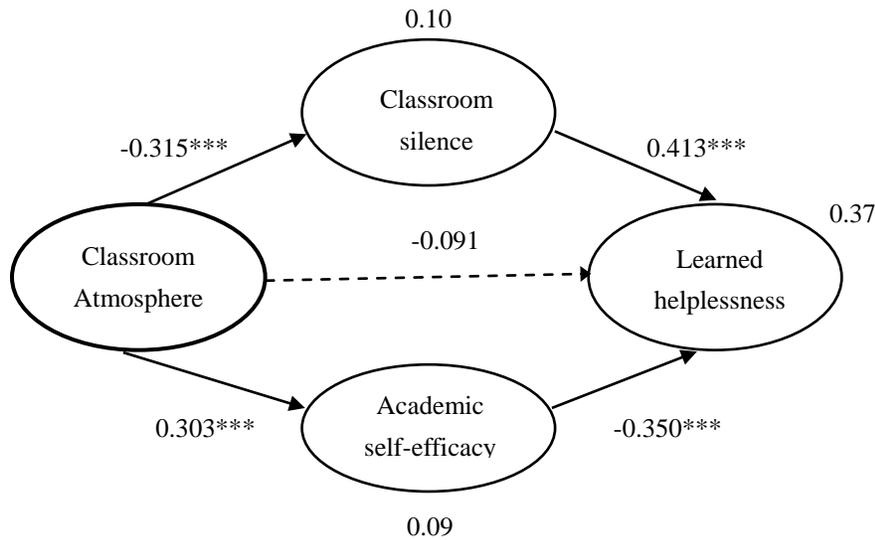


Figure 3. Mediation model

3.3 Multiple Mediating Effect

The mediating effect of classroom silence and academic self-efficacy in the relationship between classroom climate and learned helplessness is depicted in Table 1. This study employed the bootstrap method to verify this mediating effect; 5,000 bootstrapped samples were obtained with 95% confidence intervals (CIs). The sampling method involved using the nonparametric percentile method and the percentile method with deviation correction (Preacher & Hayes, 2004). The results indicated a total effect of -0.328 ; the CI value did not contain 0, suggesting the presence of a total effect. Because the results revealed a direct effect of -0.091 and the CI contained 0, a direct effect was not established. Furthermore, the total indirect effect was -0.236 , and the CI did not include 0, which indicated the presence of a total indirect effect. The indirect effect of classroom climate on learned helplessness mediated through the effect of classroom silence was -0.130 ; the corresponding CI value did not contain 0, indicating an indirect effect. The indirect effect of perceived classroom climate on learned helplessness mediated through the effect of academic self-efficacy was -0.106 ; the corresponding CI value did not contain 0, indicating an indirect effect. The results suggest that the classroom silence and academic self-efficacy of vocational college students fully mediate the relationship between classroom climate and learned helplessness.

Table 1. Bootstrap Method Estimates 95% Confidence Interval

Total, direct, and indirect effect	Path Coefficient	Bias-Corrected		Percentile	
		Lower	Upper	Lower	Upper
Total effect(CC→LH)	-0.328**	-0.427	-0.216	-0.429	-0.219
Direct effect(CC→LH)	-0.091	-0.185	0.006	-0.186	0.005
Indirect effect(CC→LH)	-0.236**	-0.314	-0.166	-0.311	-0.163
Individual indirect effect(CC→CS→LH)	-0.130**	-0.190	-0.081	-0.188	-0.080
Individual indirect effect(CC→ASE→LH)	-0.106***	-0.159	-0.068	-0.153	-0.064

Note: CC: Classroom climate, LH: Learned helplessness, CS: Classroom silence, ASE: Academic self-efficacy; *** $p < .001$

4. Discussion

4.1 The Influence of the English Classroom Climate on Learned Helplessness in Vocational College Students

The results verify hypothesis 1; the English classroom climate significantly contributed to learned helplessness in vocational college students. A supportive English classroom climate resulted in lower levels of learned helplessness in vocational college students. Therefore, a harmonious teacher–student relationship constitutes the foundation of teaching. Teachers’ full affirmation and support of students enhances their self-confidence and encourages active classroom participation, thus reducing the prevalence of learned helplessness. This result agrees with those of Guan and Wang (2020). A positive teacher–student relationship reduces students’ learned helplessness (Raufelder & Kulakow, 2022). Similar to the results of Zhang et al (2020), our results indicate the influence of peer-to-peer classroom interaction (e.g., group discussions, group reports, and brainstorming) on students’ learned helplessness. Teachers are the organizers and leaders of the classroom and the facilitators of dialogue in English classes. Teaching ability plays a critical role in students’ learned helplessness. According to the research results of Popa-Velea et al (2021), innovative teaching methods and the use of multimedia instruction in the classroom can help inspire students’ interest and participation and effectively alleviate learned helplessness. Raufelder and Kulakow (2022) reported that an orderly classroom environment can mitigate students’ learned helplessness. Students experience stronger senses of satisfaction with and belonging to the classroom environment when they perceive support from the teacher, understand

the teacher's creative teaching ideas, abide by the rules of the classroom, and engage in active participation. Furthermore, students' sense of belonging in the classroom effectively reduces learned helplessness (El Zaatar & Maalouf, 2022).

4.2 Mediation Effect of Classroom Silence on the Relationship Between Classroom Climate and Learned Helplessness

The results support hypothesis 2; English classroom silence in vocational college students mediated the influence of they perceived classroom climate on learned helplessness. That is, the English classroom climate experienced by college students influenced their learned helplessness through classroom silence. The results of this study indicate that English teachers in vocational college should encourage students to express their ideas in the classroom by interacting with them and encouraging them to interact with other students. According to Zhang (2019), students choose to remain silent when they do not perceive a cooperative classroom climate. Students who lack skills in English vocabulary, grammar, and oral expression often feel inferior and experience a sense of panic (Liu, 2021; Rahmania et al., 2022). They are afraid to answer questions and remain silent as much as possible. However, students with a sense of academic self-efficacy actively participate in classroom interactions and share their views with confidence. Having a sense of control in the classroom considerably reduces students' feelings of learned helplessness (Filippello et al., 2020).

4.3 Mediation Effect of Academic Self-Efficacy on the Relationship Between Classroom Climate and Learned Helplessness

The results support hypothesis 3; the academic self-efficacy of vocational college students mediated the effect of perceived classroom climate on learned helplessness. Thus, the academic self-efficacy of vocational college students reduced their learned helplessness in the English classroom environment. This study revealed that vocational college students confronted with the challenges of classroom participation experienced frustration with their own passive participation due to having a weak English foundation and lack of self-confidence (i.e., self-efficacy). English learning triggers feelings of anxiety, helplessness (i.e., learned helplessness), and complete loss of control in such students. However, as students' learning ability improves, so does their academic self-efficacy (Vattøy & Gamlem, 2020). Students naturally gain confidence in their ability to learn, to estimate and predict whether they will be able to complete English classroom learning tasks, and to effectively cope with challenges in advance. As a result, their learning motivation and academic achievement improve, and they participate in English classroom learning activities more willingly and with greater confidence (Omar et al., 2020).

In accordance with Bandura's (1986) SET, academic self-efficacy influences acquired behavior. This study verified that a supportive classroom climate fostered a sense of belonging in students; in addition, such an environment can bolster students' expectations of success and recognition of the intrinsic value of learning (Yossatorn et al., 2022). However, students who view themselves as incompetent (i.e., weak academic self-efficacy) experience negative emotions (i.e., learned helplessness).

Our findings are consistent with the principles of SDT proposed by Ryan and Deci (2000). When students' needs for competence (learning self-efficacy), autonomy (classroom silence), and belonging (classroom atmosphere) are simultaneously fulfilled in a second language classroom, their intrinsic learning motivation is stimulated; external motivation can be transformed into intrinsic motivation, and no motivation can be predicted (learned helplessness). Associations have been identified between an individual's acceptance of foreign culture, degree of integration, and intrinsic motivation for language learning (Borkowska, 2022). According to Hussain et al. (2020), internal learning motivation can increase students' willingness to continue learning a language. When applied to the field of language education, SDT offers a theoretical framework for enhancing students' motivation for the acquisition of a second language (Konno, 2014; Oga-Baldwin & Nakata, 2014). This theory facilitates the integration of behavioral, cognitive, and emotional strategies to promote a positive classroom environment in the field of foreign language education; in addition, SDT provides theoretical support for the stimulation of students' internal motivation for acquiring a second language.

5. Conclusions

On the basis of SDT (Ryan & Deci, 2012), we constructed a dual mediation model to estimate the mediating effects of classroom silence and academic self-efficacy on the relationship between classroom climate and learned helplessness. Furthermore, the quality of this model was evaluated through structural equation modelling, which revealed a satisfactory fit and an overall explanatory power of 37%. The findings are significant because they validate the theoretical and pedagogical suitability of the SDT approach.

5.1 Research Suggestions

First, schools should provide regular teacher training in multimedia teaching technology. The integration of multimedia technology in the classroom environment can boost learning efficacy in English language classes (Zhang & Zou, 2022). Classroom hardware influences student classroom silence (Qiao, 2010). Some researchers recommend that schools equip classrooms with as much multimedia equipment as possible for language courses (Khasawneh, 2021). Finally, postsecondary vocational colleges can organize practical English-themed activities (e.g., an English tour guide speech contest or an English robot speech demonstration) that enable students from various majors to cultivate their talents. Allowing students to solve practical problems using professional English (Syakur et al., 2020) boosts their academic self-efficacy.

Second, teachers must alter their teaching philosophy and improve their professional quality in the classroom (Moyo, 2020). First and foremost, teachers must actively participate in teacher training and strive to continually acquire knowledge (MacPhail et al., 2019). Second, teachers should study and master contemporary classroom teaching techniques. The integration of advanced teaching methods and vocational English teaching can improve the English classroom environment (Gudkova et al., 2021). In addition, teachers must focus on classroom teaching strategies and increasing student participation. Educators should create English practice scenarios based on

students' majors, employ group teaching strategies in occupational English situations, and strengthen students' cooperation, communication, and interaction (Namaziandost et al., 2019; Ingrid, 2019). Teachers should use effective classroom questioning techniques, encourage students to answer questions, and provide timely positive feedback, all of which can significantly improve students' classroom performance (Hu et al., 2021; Zhang et al., 2019).

Teaching a foreign language is a dynamic process in which students acquire knowledge and skills through active inquiry (Oga-Baldwin, 2019). Studies have revealed the main causes of students' classroom silence to be unfamiliarity with the learning content and an uncontrollable fear of the unknown (Nguyen, 2022). As a result, students should prepare well in advance of class and strengthen their familiarity with course content. Furthermore, students' participation in class discussions is associated with their ability to learn English (Namaziandost et al., 2019; Rahmania et al., 2022). Students should strive to improve their English learning abilities and their academic self-efficacy.

5.2 Limitations and Suggestions for Future Research

This study has several limitations. The sample size was limited, and all questionnaires were completed by postsecondary vocational college students in Quanzhou, China; therefore, sampling errors may have affected the research results. Furthermore, this study only investigated the effects of classroom climate and academic self-efficacy on learned helplessness. However, additional factors that may influence learned helplessness merit further research.

The scope of this study is limited due to time, geographical, and resource constraints; its results cannot be extended to other populations. Future studies should include groups such as middle school, secondary vocational school, undergraduate, and graduate students. Furthermore, a larger sample size is required to comprehensively analyze the differences between study participants and to obtain more detailed and accurate results.

Declarations

Ethics approval and consent to participate

The design of this study was reviewed and approved by the institutional review board at International College of Krirk University.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available due to the subjects' private information were collected, but are available from the corresponding authors on reasonable request.

Competing interests

All authors declare that they have no conflict of interest.

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