EFFECTS OF RESEARCH ACTIVITIES ON THE RESEARCH SELF-EFFICACY OF ENGLISH LANGUAGE STUDENT TEACHERS

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ABSTRACT

This study explored whether incorporating specific research activities into the syllabus could develop the research self-efficacy of a group of English language student teachers in Vietnam who belong to a demographic group currently underrepresented in self-efficacy literature. It investigated whether the students in the experimental group exhibited higher self-efficacy scores and achieved better research performance after the treatment. Additionally, it explored the correlation between self-efficacy and research performance and examined the perceived effects of the treatment on self-efficacy. The study adopted a quasi-experimental research design and a mixed-methods methodology. The participants of this study were 90 student teachers divided into a control group and an experimental group. Pre- and post-questionnaires and weekly reflective journal entries were used as data tools. Students' research proposal scores were used to compare their research performance. The findings indicated that including research activities enhanced students' research self-efficacy in the experimental group. These students exhibited a stronger sense of research self-efficacy and performed better than those in the control group. The development of self-efficacy through the four sources of self-efficacy was confirmed. The study's findings are informative to designing, refining, and optimising future programmes/interventions that facilitate the effects of research experiences, knowledge, and skills on undergraduates' research self-efficacy beliefs.

Keywords: quasi-experimental; research self-efficacy; undergraduates; Vietnam

Introduction

Improving undergraduate research is essential for various reasons, including raising students' awareness of graduate research, fostering collaboration and networking, introducing graduate education, and cultivating lifelong skills (Hill et al., 2022). However, in many Vietnamese universities, students mainly engage in scientific research projects during their fourth year, when they work on their graduation thesis, with limited exposure to research methodology in earlier years (Ngo, 2019). Consequently, they are often confused when researching their graduation thesis (Ngo, 2019). Recently, efforts have been made to improve the undergraduate research experience within Vietnamese education institutions, including providing more resources and encouraging research into this issue. Previous studies in the Vietnamese context (Le & Hoang, 2021; Ngo, 2019) have explored essential topics such as students' perceptions of the importance of research skills, research attitudes, and self-assessment of research knowledge and skills, with student teachers as the primary research participants. However, there is a dearth of studies on English language student teachers' research confidence in the previous literature.

Research includes systematically investigating a particular subject matter. It involves collecting and analysing information, data, and evidence to answer questions or solve problems (Medaille et al., 2022). For undergraduates, a lack of research experience, motivation, and exposure to research methods can harm their attitudes and beliefs about science and scientific knowledge. Researchers (Seng et al., 2020a; van Blankenstein et al., 2019) suggest that self-efficacy, that is, an individual's confidence in their ability to complete specific tasks successfully (Schunk & Pajares, 2010) is one of the most important predictors of student performance, effort, and motivation. Recently, research self-efficacy, a person's belief about his/her ability to conduct research-related tasks (Bishop & Bieschke, 1998) has been investigated in different educational fields. However, scholars (Baker & DeDonno, 2020; Hill et al., 2022) believe that more studies have been done on the research self-efficacy beliefs of graduates (e.g., doctorate students) than undergraduates. Given the benefits noted from previous studies investigating research self-efficacy (Seng et al., 2020b), it is appropriate to conduct a study to understand the research self-efficacy of undergraduates in the Vietnamese context.

In this study, I explored whether incorporating specific research activities (RAs) into the syllabus could develop the research self-efficacy of a group of English language student teachers who belong to a demographic group currently underrepresented in self-efficacy literature. Knowledge gained from my study is informative to the design, refinement, and optimisation of research programmes that facilitate the effects of research experiences, knowledge, and skills on research self-efficacy. The study answered the following research questions:

1. Are there any significant differences in the self-efficacy levels between students in the control group and those in the experimental group?
2. Do the students in the experimental group achieve better research performance?

3. Is there a correlation between research self-efficacy and research performance?
4. What are the perceived effects of the treatment on self-efficacy?

Literature Review

Social Cognitive Theory and Self-Efficacy Beliefs

Social cognitive theory (Bandura, 1997) emphasises the reciprocal relationship between environmental factors (e.g., physical conditions), personal factors (e.g., personal traits, beliefs), and behaviours (e.g., actions and choices). Individuals possess the power to influence and modify the environment in which they live while being simultaneously influenced by it. Self-efficacy is a principal component of social cognitive theory and a key determinant of human motivation and behaviour (Bandura, 1997). The degree of efficacy people feel in their ability to do a particular task can influence their motivation, effort, persistence, and resilience while attempting to complete the task. Self-efficacy can potentially influence academic performance (Usher et al., 2015). Self-efficacious students are likelier to gain better learning outcomes than those without self-efficacy. Self-efficacy is task-, context-, and domain-specific (Klassen & Klassen, 2018). Various tasks, contexts, and domains may require various knowledge, skills, and experiences.

Bandura (1997) proposed that individuals' self-efficacy develops through processing four sources of self-efficacy: mastery experiences, vicarious experiences, social persuasion, and physiological and emotional states. Mastery experiences are previous successful or unsuccessful performances that offer individuals insights into their strengths and weaknesses. Vicarious experiences involve observing others completing a particular task, which can assist people in judging their abilities to perform the same task. Social persuasion refers to verbal or non-verbal judgments from others regarding an individual's ability to do a particular task, which can provide information for the development of self-efficacy. Physiological and emotional states are individuals' emotional and physiological arousal while performing a specific task. These states aid individuals in assessing their self-efficacy. In a given setting, the availability of sources of self-efficacy can shape people's beliefs of their abilities to accomplish specific tasks.

Some scholars propose enhancing self-efficacy by targeting its sources of information. Overall (2011) recommended establishing a research environment where graduate students can comfortably seek assistance, ask questions, and voice their opinions. The emphasis is on the role of supportive peers who offer encouragement (social persuasion), nurture positive emotions (physiological and emotional states), and provide examples of successful experiences (vicarious experiences). Pierrakos and Martin (2008) utilised weekly discussion sessions as a means for students to receive advice and share their experiences, thereby influencing self-efficacy through social persuasion and vicarious experiences. Hebert et al. (2014) conducted open discussions at the beginning of the semester, allowing students to address research-related fears and anxiety affecting their physiological and emotional states. García and Caso (2006) provided clear examples of how students' writing self-

efficacy could be improved through skill development (mastery experiences) and a supportive environment. Various strategies were employed, including flexible seating arrangements, adaptable learning schedules, and using smiles for social reinforcement. Discussions were structured to give students feedback from peers and instructors, encompassing vicarious experiences and social persuasion. Students were assigned manageable tasks, supported by progress tracking to demonstrate improvement. Some scholars advocated a blend of easy and challenging tasks to develop self-efficacy. Bandura (2007) emphasised that success in more straightforward tasks can boost self-efficacy, while effectively handling more challenging ones can further strengthen it. In line with this, Hebert et al. recommended introducing feasible research tasks initially and gradually incorporating challenging assignments after students master fundamental skills. To support students in tackling complex tasks or skills, scaffolding, a process in which students receive guidance to perform, learn, and solve tasks they cannot manage independently (Yantraprakorn et al., 2013), has been recognised as beneficial. Yantraprakorn et al. (2013) outlined various scaffolded activities, from macro-level to micro-level, which educators can implement in their classrooms to assist students in handling learning challenges and enhancing their self-efficacy in accomplishing assigned tasks.

Research Self-Efficacy

Bandura's (1997) concept of self-efficacy beliefs has been applied to understand individuals' confidence in carrying out research-related activities. Many studies investigating research self-efficacy have recently been published (Poh & Abdullah, 2019). Previous studies focus on measuring levels of research self-efficacy or examining the predicting factor of research self-efficacy (Baker & DeDonno, 2020). Researchers have found undergraduates often exhibit low research self-efficacy (Seng et al., 2020a). Research self-efficacy is a crucial factor impacting students' willingness to conduct research (Wright & Holttum, 2012), research attitudes (Robnett et al., 2015), research productivity (Adekunle & Madukoma, 2022), research careers (Adedokun et al., 2013; Carpi et al., 2016), and academic performance (Poh & Abdullah, 2019; Tiyuri et al., 2018; van Blankenstein et al., 2019). Given the importance of fostering self-efficacy in students, scholars have emphasised the vital role of training programmes in improving research self-efficacy. Several authors (Baker & DeDonno, 2020; Black et al., 2013; Butz et al., 2018; Seng et al., 2020b) have tested the effectiveness of short-term research training programmes on research self-efficacy. The results of these studies support findings in the literature, indicating that short-term training programmes help to increase students' research self-efficacy and learning.

There are some primary concerns with current studies that investigate the effectiveness of research activities/programmes on research self-efficacy. First, most of these studies (Antonou et al., 2020; Black et al., 2013; Seng et al., 2020b) lack a control group. Without a control group, we cannot decide whether the changes in self-efficacy levels result from the training or other external factors such as maturation (Black et al., 2013). Additionally, researchers have overlooked comparing

objective research performance data between the two groups. The only study in my review that includes performance data is that of Baker and DeDonno (2020). In addition to students' self-perceptions, measuring the actual impact of any treatment on research self-efficacy is crucial. Objective data can offer a more comprehensive and unbiased perspective on the effects. Third, some scholars have utilised scales developed by other researchers without adapting them to suit their specific research contexts. For example, Seng et al. (2020a) and Seng et al. (2020b) employed the research self-efficacy scale developed by Phillips and Russell (1994) in their studies to understand the impact of short-term training programmes on undergraduates' self-efficacy. The original scale is designed for graduate students. Therefore, some items are irrelevant to contemporary undergraduate students such as "writing statistical computer programmes." Using such a scale without removing or adapting these items can lead to inaccurate or incomplete study results. Furthermore, researchers have developed or used research self-efficacy constructs that do not align with self-efficacy properties. For example, the scales in the study of Black et al. (2013) and Büyüköztürk et al. (2011) included certain items which assessed students' perceptions of their current abilities, not future-oriented ones (e.g., "I do not find it difficult at all to compare the results of my research to prior research results"). Amador-Campos et al. (2023) used some items measuring self-esteem focusing on how individuals can feel about themselves and their abilities (e.g., "I'm upbeat about my post-graduation career prospects") or self-competence, which evaluates overall abilities across different domains (e.g., "I'm on track to complete my degree programme on time"). These items do not directly assess research self-efficacy, which is task and situational-specific. Finally, yet importantly, previous work has primarily overlooked the use of sources of self-efficacy as a framework to design training programmes to improve research self-efficacy. Only one study has explored this topic, conducted by Bakken et al. (2010). Therefore, the present study is the first in Vietnam to apply the social cognitive theory as a framework for examining the effects of RAs on the research self-efficacy beliefs of English student teachers.

Materials and Methods

This quasi-experimental study targets four sources of self-efficacy information by integrating certain RAs into the syllabus. It uses a research self-efficacy instrument following Bandura's recommendations, includes performance data, and employs control and experimental groups in the research design. Pre- and post-questionnaires and weekly reflective journal entries were used as data tools. The scores from students' research proposals were used to measure the actual impact of the treatment.

Research Context

The study included 90 English majors from the Faculty of Foreign Languages at a university in Vietnam, comprising 74 females and 16 males. Their ages ranged from 21 to 22 years old. Their self-reported English language proficiency ranged from B2 (98.1%) to C1 (1.9%) (Common European Framework of Reference for Languages).

The students had never taken part in any scientific research projects before. At the point of data collection, all students had completed a research methodology course taught in Vietnamese and were enrolled in a Research-Writing Skills course. The course spans approximately three months and consists of 30 teaching periods. Students meet once a week for two hours and thirty minutes. The course aims to provide students with theoretical knowledge of conducting research and developing scientific writing skills. Students are required to submit a research proposal at the end of the course. The textbook used for the course is *Thesis and Dissertation Writing in a Second Language* by Paltridge and Starfield (2007). The researcher used convenience sampling to select participants for the present study. One class (Class A) served as the control group, while the other class received the treatment (Class B). The details of the two groups are presented in Table 1.

Table 1
Sample Characteristics

Demographic	Participants	
	Class A	Class B
Participants	45	45
Gender, n (%)		
Male	7 (15.6)	9 (20)
Female	38 (84.4)	36 (80)
English proficiency, n (%)		
B2	33 (73.3)	35 (77.8)
C1	12 (26.7)	10 (22.2)

The Research Activities

The RAs provided students in the experimental group with practical research experiences and opportunities to share specific knowledge and skills not covered in the syllabus. The RAs were designed to offer the students scaffolded activities as suggested by Yantraprakorn et al. (2013) to accomplish different research tasks (mastery experiences), learn from working with peers (vicarious experiences), get feedback from peers and the instructor (social persuasion), and experience various levels of emotions when involving in the research tasks (physiological and emotional states). There were 12 online training sessions and discussions, each lasting 90 minutes, conducted over three months alongside the Research-Writing Skills course. Class A did not participate in the RAs in this study but followed the theory-oriented syllabus (refer to Table 2). The four sources of self-efficacy information incorporated the training sessions and discussions (see Table 3). Before each discussion topic, Class B students were given specific homework assignments. Homework was designed in such a way that students had a sense of accomplishment and there was room for improvement. Each discussion started with an open exchange of students' challenges and experiences when doing particular tasks and their expectations from peers and the instructor. Next, peers provided feedback, followed by the instructor offering

verbal and written feedback, highlighting achievements, and indicating areas requiring attention.

Table 2
Format of Instructions

Class A	Textbook	Specific training and discussions	
	1. Finding a research gap 2. Forming research questions 3. Writing the introduction chapter 4. Writing the literature review chapter 5. Research methodology and research tools 6. Writing the results chapter 7. Writing the conclusion chapter 8. Writing the abstract 9. APA referencing style	None	
Class B	**Textbook**	**Specific training and discussions**	
		Training	Discussions
	The book is the same as the one used in Class A	1. Quotations and plagiarism 2. SPSS programme 3. Analysing quantitative data using the SPSS programme 4. Analysing qualitative data (content analysis, thematic analysis) 5. Endnote	1. Research gaps and research questions 2. The introduction chapter 3. The literature review chapter 4. The research design chapter 5. The results chapter 6. The conclusion chapter 7. The abstract

Table 3
Discussion Example

7th discussion: The abstract (90 minutes)			
Activities	Student	Instructor	Sources of self-efficacy
1. Analysing a Bachelor Thesis abstract	Completing Homework Assignment 1	Explaining assignment requirements	Vicarious experience
2. Re-writing an abstract	Completing Homework Assignment 2	Explaining assignment requirements	Mastery experience
3. Discussion	Discussing assignments 1 and 2 in small groups and with the whole class	Creating a positive atmosphere in class (e.g., allowing students to select their groups) Giving verbal and written feedback	Physiological and emotional states Social persuasion Mastery experiences Vicarious experiences

Instruments

The Research Self-Efficacy Questionnaire

The questionnaire consisted of two sections. The first section collected students' demographic information, including gender, age, previous research experiences, and perceived English language competence. The second section consisted of 27 items, categorised into four constructs: research planning (eight items), data collection and analysis (six items), research communication (seven items), and scientific writing (six items). The questionnaire was discussed among the author and other researchers to minimise meaning ambiguity and ensure the inclusion of fundamental research tasks and skills specific to English language student teachers in the local context. Five-point Likert scale was used, where a score of 1 indicated "not self-efficacious", and 5 indicated "absolutely self-efficacious". The responses were averaged, resulting in a single score with higher scores signifying higher levels of research self-efficacy.

A pilot test of the questionnaire was conducted using a sample of 219 English language student teachers who were selected from the target population and were not part of the actual study. An exploratory factor analysis test indicated that items "Meeting deadlines effectively" and "Allocating time for different research activities" demonstrated cross-loadings, with loadings differing by 0.054 and 0.079, respectively. The item "Approaching potential participants" did not load onto any extracted factors. Consequently, these items were excluded, and the author performed the analysis test again with 24 remaining questions. The factor loading distributions of the updated version of the questionnaire ranged from .583 to .823. The revised questionnaire consisted of three dimensions: research planning (six items), research skills and

communication (12 items), and scientific writing (six items). The scale exhibited strong internal consistency, as indicated by a total Cronbach's alpha of .966. The Cronbach's alphas of the three subscales were .885 for research planning, .878 for research skills and communication, and .948 for scientific writing. A Kaiser-Meyer-Olkin (KMO) value of .959 was obtained, and Bartlett's test demonstrated significance ($p < .001$).

In the present study, which involved a control group (Class A) and an experimental group (Class B), the reliability analyses of the pre-tests and post-tests are presented in Table 4.

Table 4
Reliability Analyses

	Class A pre-test	Class B pre-test	Class A post-test	Class B post-test
Cronbach's Alpha	.840	.846	.859	.916

Journal Entries

In this study, journal entries were used to investigate how undergraduate students perceived the impact of the RAs on their research self-efficacy. These entries, documenting weekly experiences, showed how students assessed and selected sources of self-efficacy information when building their research self-efficacy. Additionally, the entries revealed a connection between developing self-efficacy, knowledge growth, and skill development. Guidelines in the form of prompts were provided, and all participants chose to write their entries in English when given the choice between Vietnamese and English. Out of 45 students in Class B, 24 (53%) submitted their entries via email over approximately four months, resulting in 205 journal entries collected by the end of the data collection period.

Research Performance

As per the syllabus, students had to submit a research proposal for assessment at the end of the course. The scores from the proposals were utilised in this study with the student's permission from both classes.

Data Collection and Analysis Procedures

The study was conducted at the Industrial University of Ho Chi Minh City (IUH), Ho Chi Minh City, Vietnam. The study was approved by the IUH Scientific Review & Ethics Committee (Reference number 296/QĐ-ĐHCN/2023). Approval was secured from faculty leaders before initiating the informed consent process. English seniors in two classes taught by the same instructor, who also conducted the research, were emailed and asked if they were interested in participating. The email made it clear that participation was voluntary and would not impact their course progress or

performance. It also guaranteed complete anonymity throughout the study. All students in Class A and Class B consented to their data.

The data collection spanned approximately four months. Initially, 90 participants filled out pre-questionnaires online in the classroom. The post-questionnaire was also online, but students could complete it at their convenience outside the classroom. Both questionnaires, given at the start and end of the treatment, were identical and took roughly 15 minutes to complete. Class B students began writing journal entries after the first training session one week after distributing the pre-questionnaire. The final entries were collected approximately two weeks after the last training session and one week after the post-questionnaire. The privacy and confidentiality of the participants were respected and protected throughout this research. Pseudonyms were used to replace participants' real names.

The collected quantitative data were analysed by the SPSS programme. An independent t-test was conducted to compare the research self-efficacy levels between the two groups. Another independent t-test was conducted to examine the potential differences in the students' performance scores in the control and treatment groups. Pearson correlation was conducted to examine the relationship between self-efficacy and research performance.

Qualitative data were analysed to understand the perceived effects of the RAs on research self-efficacy, following the procedures of both the inductive coding process (Creswell, 2012) and the thematic coding method (Braun & Clarke, 2006). This involved multiple rounds of coding, initially to identify the sub-themes and then to apply the finalised coding framework. The author coded for theoretical themes, specifically focusing on the effects of the RAs on research self-efficacy, as addressed in the last research question. The author commenced analysing data by examining individual student data and subsequently compared the codes, themes, and categories across the 24 students.

Results

Self-Efficacy Levels

An independent t-test was used to understand the differences in self-efficacy levels between the two groups. As shown in Table 5, no significant difference between Class A and Class B was found before the treatment (sig. = .283>.05). However, a significant difference was observed between the two groups after the treatment (sig. = .000<.05). The mean self-efficacy ratings were 2.63 for Class A students and 4.01 for Class B students. Students in the control group (Class A) exhibited low self-efficacy in research-related activities, while those in the experimental group demonstrated higher self-efficacy. Referring to Table 6, Class B students displayed the highest levels of self-efficacy in scientific writing, scoring 4.23. Their levels of self-efficacy in research planning, research skills, and communication were relatively similar, hovering around 3.9. On the other hand, Class A students maintained consistently low self-efficacy levels across three dimensions, averaging around 2.6.

Table 5

Self-Efficacy Scores of the Two Groups Before and After the Treatment

	n	Min.	Max.	Mean	SD	Sig. (2-tailed)
Pre-test						
Class A	45	1	5	2.19	.690	.283
Class B	45	1	5	2.33	.589	
Post-test						
Class A	45	1	5	2.63	.360	
Class B	45	1	5	4.01	.196	.000

Table 6

Post-test Self-Efficacy Scores for each factor

	n	Min.	Max.	Mean	SD
Research planning					
Class A	45	1	5	2.67	.430
Class B	45	1	5	3.90	.306
Research Skills & Communication					
Class A	45	1	5	2.60	.417
Class B	45	1	5	3.95	.342
Scientific writing					
Class A	45	1	5	2.63	.453
Class B	45	1	5	4.23	.211

Research Performance of the Two Groups

Another independent t-test was run to compare the students' performance scores in the control and experimental groups. The students' average scores in Class A and B were 2.81 and 3.65, respectively (see Table 7). The results indicated that students in the experimental group performed better than those in the control group.

Table 7

Performance Scores of the Two Groups

Scores		n	Min.	Max.	Mean	SD	Sig. (2-tailed)
	Class A	45	0	4	2.81	.306	.000
	Class B	45	0	4	3.65	.270	

Research Self-Efficacy and Research Performance

A positive correlation was found between students' research self-efficacy and their research performance, and the correlation was quite strong (referring to Tables 8 and

9). The result indicated that those who scored higher on the assignment had a stronger sense of self-efficacy. Put differently, research self-efficacy was an important factor affecting students' research performance and positively impacted their achievement.

Table 8

Descriptive Statistics

	n	Mean	SD
Score	90	3.23	.510
Research self-efficacy	90	3.32	.753

Table 9

Correlations Between Students' Research Self-Efficacy and Research Performance

		Self-efficacy	Score
Research self-efficacy	Person Correlation	1	.827**
	Sig. (2-tailed)		.000
	N	90	90
Score	Person Correlation	.827**	1
	Sig. (2-tailed)	.000	
	N	90	90

**. Correlation is significant at the 0.01 level (2-tailed).

Perceived Effects of the Treatment

The qualitative data showed students' enhanced sense of self-efficacy after the treatment. The students reported a higher sense of self-efficacy through their descriptions of a) a growth in research knowledge and skills and b) a therapeutic research-training environment.

A Growth in Research Knowledge and Skills

All students mentioned the expanded research knowledge and skills they gained during the RAs, contributing to their self-efficacy development. Owing to the knowledge and skills provided from training sessions, the feedback from peers and the instructor (social persuasion) during the discussions, and learning from reading articles and peers (vicarious experiences), they could develop their scientific writing and data analysing skills.

Knowledge of Scientific Writing.

The students agreed that their scientific writing skills improved weekly. Compared to other research tasks, the students appeared to be more self-efficacious in performing particular tasks related to scientific writing, as they used prominently positive

language such as "delighted", "more knowledge", "sufficient", "confident", "really excited", "important", "helpful", "useful", "happy", and "effective" to depict their experiences. For example, some students wrote:

> I'm delighted I picked up some knowledge from this course. … My research writing skills have developed through the completion of writing tasks, reading articles, listening to my teammates' ideas and suggestions, having discussions with them, giving and receiving feedback, as well as through reflecting on my own skills weekly. … I had sufficient instructions in class that guided me to complete the paraphrased paragraphs. I feel confident somehow because I am aware of what will happen in the next stage.
>
> From the reading and analysis of articles, I discovered that my writing should follow a standardised structure. … I have collected helpful technical vocabularies, including reporting verbs and hedging language items. They are especially useful for my thesis writing in the future, and I'm happy that I am in this class.
>
> I was obsessed with references in my previous Research Method course. I'm thankful to the instructor that helped me to practice my automated citation and bibliography generation. This new skill saved me time and reduced my citation errors.

Analysing Data.

The students wrote about the challenges of analysing data. The use of both negative and positive language (e.g., "very time consuming", "have never learned", "tough", "laborious", "interesting", and "useful") in their descriptions of how they experienced the task suggests fluctuations in self-efficacy beliefs. However, the students all acknowledged the importance of data analysis in future research, which helped develop their determination to accomplish the challenging task. The accomplishment of the particular tasks gradually developed a sense of competence in doing similar research tasks in the future.

> I attended a session on SPSS. … The session helped me learn how to import, clean, and manipulate data from Excel spreadsheets. I also learned some calculations and present descriptive statistics. … I could follow the instructions and do some analysis tasks precisely. … It is not easy for me at all. … The analysis program is important for my thesis writing next semester, so I need to strive.
>
> I learned that manual thematic analysis can be very time-consuming. I have never learned that before. … I'm thankful for the instructor and my teammates' comments on my organisation of codes and themes. The task was laborious but interesting.
>
> This week, the instructor guided us to develop a sample plan for the qualitative data analysis process. I can see that it is quite easy to get lost and feel overwhelmed, but careful data storage and detailed records of the analysis process can help.

A Therapeutic Research Training Environment.

Twenty students in the experimental group reported psychological benefits from the RAs. They found that participating in discussions and interactions with their peers and the instructor created a comfortable and secure environment, reducing their anxiety and stress. This supportive atmosphere also helped them address research limitations and plan specific tasks, ultimately boosting their self-efficacy. Representative examples are:

> I found that I'm not the only student having difficulties. My instructor told us that having a challenge using the analysis tools is normal. … I feel less pressure as my teammates and my instructor gave me a lot of useful advice.
> I feel much more confident than before because I understand the concepts of the research methodology better. I was very worried that I could not finish the task. A classmate today had a nice explanation of how he reviewed the research methodology. I have one real example!
> The instructor told us several times that we could text or send her emails if we had any questions. I'm happy with her support. The atmosphere during class discussions is amazingly comfortable. I'm happy I can meet my classmates weekly to talk about my frustrations and listen to their stories and advice.

Discussion

Findings indicated that including specific research activities enhanced students' research self-efficacy in the experimental group. These students exhibited a stronger sense of research self-efficacy and performed better than those in the control group. The development of self-efficacy through the four sources of self-efficacy was confirmed. Students in the experimental group gradually developed an increased sense of self-efficacy due to their growth in research knowledge and skills and the supportive research-training environment provided as part of the treatment.

The results of the present study indicate that, following the treatment, the mean scores of research self-efficacy for Class B students were higher than those of Class A. The mean self-efficacy scores for Class B students after the treatment (4.01) also increased compared to their scores before the treatment (2.33). Additionally, students in the experimental group performed better in their research proposals than the control group students. A positive correlation was observed between students' research self-efficacy and their research performance. The positive effects of the treatment on the research self-efficacy of students in the experimental group were confirmed in the study.

The self-efficacy levels of the students in the experimental group increased after the treatment is similar to what other researchers found in other studies (Baker & DeDonno, 2020; Black et al., 2013; Butz et al., 2018; Seng et al., 2020b). Unlike the participants in the study by Hess et al. (2023), who developed significant scientific self-efficacy due to their previous research experience, qualitative data in this study indicate that the higher mean scores of the participants were attributed to their

perceived growth in research knowledge and skills and the supportive research-training environment. Participants' greater understanding of research knowledge and skills after the treatment is parallel to findings obtained in previous research (Baker & DeDonno, 2020; Pierrakos & Martin, 2008; Seng et al., 2020a; Seng et al., 2020b). The contribution of this study to the field lies in its utilisation of a research self-efficacy instrument adhering to Bandura's (1997) recommendations, inclusion of research performance data, incorporation of both a control group and an experimental group in the research design, and engagement of participants who have received relatively less attention in the existing literature.

In this study, Class A students (the control group) maintained consistently low self-efficacy levels across three dimensions, averaging around 2.6. Class B students learned the theories prescribed in the syllabus and had opportunities to access hands-on experiences and discussions in the RAs. At the same time, those in Class A only followed the theory-oriented syllabus. Class A students may have needed more opportunities to practice and succeed in completing the tasks offered in the treatment, contributing to their lower sense of research self-efficacy and lower performance scores. The Research-Writing Skills course's time and curriculum constraints made it challenging for control group students to grasp the necessary knowledge and skills. Since incorporating practice opportunities and sharing experiences in discussions resulted in a higher sense of self-efficacy of students in the experimental group, learning time and the content of the current course syllabus should be reviewed. Adapting the syllabus to include additional hands-on experiences and discussions is worth considering.

The cultivation of self-efficacy through four sources of self-efficacy is confirmed in this study. The hands-on experiences and practice helped the students in the experimental group to master research tasks step-by-step so that they experienced success (mastery experiences). The interaction with peers and the instructor, the sharing sessions during discussions, and the pleasant research training environment (physiological and emotional states) helped reduce research anxieties and difficulties. The constructive feedback from peers and the instructor (social persuasion) enabled the students to recognise their research limitations and develop strategic learning plans. Examining peers' work and reading articles (vicarious experiences) improved research skills, resulting in higher self-efficacy.

Supportive peers and mentors have been known to contribute to positive research experiences and research self-efficacy among postgraduate students (Liu et al., 2019; Love et al., 2007; Overall et al., 2011). Some scholars (Medaille et al., 2022; Poh & Abdullah, 2019) mentioned the contribution of the warm, friendly, and supportive research environment to a stronger sense of research self-efficacy. However, previous research has primarily overlooked the use of sources of self-efficacy as a framework to design programmes aiming at improving research self-efficacy. Therefore, the present findings have important implications for future research activities/ training programmes.

By understanding how RAs helped students in the experimental group cope with frustrations and challenges and enhance their self-efficacy, several suggestions for future programmes are made. Firstly, the combination of skills development and a supportive environment may bring the most benefits to undergraduates' self-

efficacy. The warm and friendly research-training environment, which provides reassurance, sympathy, and encouragement, will probably make undergraduates feel safe to seek help to overcome research challenges. Supportive feedback recognising students' efforts and achievements and pointing out their areas for improvement (Pierrakos & Martin, 2008) may gradually cultivate students' research abilities. Secondly, the knowledge and skills provided by the RAs should include hands-on experiences, and learning opportunities should allow for progressive success. The students complete basic tasks and enjoy success before moving to more challenging tasks. Thirdly, the RAs should include weekly open discussions, allowing students to share challenges, reduce stress, and exchange knowledge and skills. The discussions nurture a positive learning culture, which fosters a stronger sense of research self-efficacy among students.

Conclusion

The quasi-experimental study showed that students in the experimental group exhibited a stronger sense of research self-efficacy and performed better than those in the control group. The development of self-efficacy through the four sources was confirmed. There are some limitations of this study. First, participant selection was not random, making it challenging to ensure initial equivalence between the two groups and weakening the research's inferential power. There is also a concern that students from both groups may have shared ideas outside the study, potentially contaminating the results. The study's external validity may be limited since it was conducted in a unique setting with EFL student teachers, making generalisation to other settings challenging. Furthermore, the study duration was relatively short (about four months), providing a limited perspective on self-efficacy development. Future research should consider tracking self-efficacy in more extended activities like thesis writing to draw firmer conclusions (Medaille et al., 2022). Despite these limitations, the study's implications are valuable for designing training programmes to enhance research self-efficacy in various settings.

References

Adedokun, O., Bessenbacher, A., Parker, L., Kirkham, L., & Burgess, W. (2013). Research skills and STEM undergraduate research students' aspirations for research careers: Mediating effects of research self-efficacy. *Journal of Research in Science Teaching, 50*(8), 940-951. https://doi.org/10.1002/tea.21102

Adekunle, P. A., & Madukoma, E. (2022). Information literacy, research self-efficacy, and research productivity of doctoral students in universities in Ogun State, Nigeria. *International Journal of Doctoral Studies, 17* (5), 479-511. https://doi.org/10.28945/5030

Amador-Campos, J. A., Peró-Cebollero, M., Feliu-Torruella, M., Pérez-González, A., Cañete-Massé, C., Jarne-Esparcia, A. J., Triadó-Ivern, X., & Guàrdia-Olmos, J. (2023). Mentoring and research self-efficacy of doctoral students: A

psychometric approach. *Education Sciences, 13*(4), 1-14. https://doi.org/10.3390/educsci13040358

Antonou, A., Liesman, S., & Powell, M. (2020). Impacts of a cross-institutional undergraduate research experience workshop on student understanding of and self-efficacy for research. *PRIMUS, 32*(3), 1–14. https://doi.org/10.1080/10511970.2020.1818333

Baker, T., & DeDonno, M. (2020). The influence of research participation, field of study, and gender on research self-efficacy. *The International Journal of Learning in Higher Education, 27*(2), 11-26. https://doi.org/10.18848/2327-7955/CGP/v27i02/11-26

Bakken, L., Byars, A., Gundermann, D., Ward, E., Slattery, A., King, A., Scott, D., & Taylor, R. (2010). Effects of an educational intervention on female biomedical scientists' research self-efficacy. *Advances in Health Sciences Education: Theory and Practice, 15*(2), 167-183. https://doi.org/10.1007/s10459-009-9190-2

Bandura, A. (1997). *Self-efficacy: The exercise of control*. Freeman

Black, M., Curran, M., Golshan, S., Daly, R., Depp, C., Kelly, C., & Jeste, D. (2013). Summer research training for medical students: Impact on research self-efficacy. *Clinical and translational science, 6*(6), 487-489. https://doi.org/10.1111/cts.12062

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101. http://dx.doi. org/10.1191/1478088706qp063oa

Butz, A., Branchaw, J., Pfund, C., Byars-Winston, A., Leverett, P. (2018). Promoting STEM trainee research self-efficacy: A mentor training intervention. *Understanding Interventions Journal, 9*(1), 1-25

Büyüköztürk, Ş., Atalay Kabasakal, K., Sozgun, Z., & Kebapçı, Ş. (2011). The development of research self-efficacy scale. *Cypriot Journal of Educational Sciences, 6*(1), 22-27.

Carpi, A., Ronan, D., Falconer, H., & Lents, N. (2016). Cultivating minority scientists: Undergraduate research increases self-efficacy and career ambitions for underrepresented students in STEM. *Journal of Research in Science Teaching, 54*(2), 169-194. https://doi.org/10.1002/tea.21341

Creswell, J. W. (2012*). Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (4th ed.*)*. Pearson.

García, J. N., & de Caso, A. M. (2006). Changes in writing self-efficacy and writing products and processes through specific training in the self-efficacy beliefs of students with learning disabilities. *Learning Disabilities: A Contemporary Journal, 4*(2), 1-27.

Hebert, C., Kulkin, H., & Ahn, B. (2014). Facilitating research self-efficacy through teaching strategies linked to self-efficacy theory. *American International Journal of Social Science, 3*(1), 44-50.

Hess, R. A., Erickson, O. A., Cole, R. B., Isaacs, J. M., Alvarez-Clare, S., Arnold, J., … Dolan, E. L. (2023). Virtually the same? Evaluating the effectiveness of remote undergraduate research experiences. *CBE Life Sci Educ, 22*(2), 1-12. https://doi.org/10.1187/cbe.22-01-0001

Hill, H., Zwahr, J., & Gonzalez, III. (2022). Evaluating research self-efficacy in undergraduate students: Experience matters. *Journal of the Scholarship of Teaching and Learning, 22*(1), 67-80. https://doi.org/10.14434/josotl.v22i1.31203

Klassen, R. M., & Klassen, J. R. L. (2018). Self-efficacy beliefs of medical students: A critical review. *Perspective on Medical Education, 7*(2), 76-82. https://doi.org/10.1007/s40037- 018-0411-3

Le, T. T. H., & Hoang, T. H. Y., (2021). Năng lực nghiên cứu khoa học của sinh viên sư phạm tiếng Anh tại trường Đại học Vinh [Research ability of English student teachers at Vinh University]. *Tạp chí Khoa học Giáo dục Việt Nam [Vietnam Education Science], 19*(5), 108-113.

Liu, C., Wang, L., Qi, R., Wang, W., Jia, S., Shang, D., Shao, Y., Yu, M., Zhu, X., Yan, S., Chang, Q., & Zhao, Y. (2019). Prevalence and associated factors of depression and anxiety among doctoral students: The mediating effect of mentoring relationships on the association between research self-efficacy and depression/anxiety. *Psychol Res Behav Manag, 12*, 195-208. https://doi.org/10.2147/prbm.s195131

Love, K., Bahner, A., Jones, L., & Nilsson, J. (2007). An investigation of early research experience and research self-efficacy. *Professional Psychology: Research and Practice, 38*(3), 314-320. https://doi.org/10.1037/0735-7028.38.3.314

Medaille, A., Beisler, M., Tokarz, R., & Bucy, R. (2022). The role of self-efficacy in the thesis-writing experiences of undergraduate honors students. *Teaching and Learning Inquiry, 10*, 1-22. https://doi.org/10.20343/teachlearninqu.10.2

Ngo, T. T. (2019). *Developing the educational research ability of student teachers*. [Unpublished PhD thesis]. Hanoi National University of Education. http://luanvan.moet.edu.vn/?page=1.2&view=33939

Overall, N., Deane, K., & Peterson, E. (2011). Promoting doctoral students' research self-efficacy: Combining academic guidance with autonomy support. *Higher Education Research and Development, 30*(6), 791-805. https://doi.org/10.1080/07294360.2010.535508

Paltridge, B., Starfield, S. (2007). *Thesis and dissertation writing in a second language: A handbook for supervisors (1st ed*.). Routledge. https://doi.org/10.4324/9780203960813

Phillips, J. C., & Russell, R. K. (1994). Research self-efficacy, the research training environment, and research productivity among graduate students in counseling psychology. *The Counseling Psychologist, 22*(4), 628-641.

Pierrakos, O., & Martin, J. (2008, June). *Utilising a social cognitive theoretical framework to investigate the influences of a summer undergraduate research experience on participants' academic and career plans* [Paper presentation]. Annual Conference & Exposition, 2018, Pittsburgh, Pennsylvania. https://doi.org/10.18260/1-2--3386

Poh, R., & Abdullah, A. (2019). Factors influencing students' research self-efficacy: A case study of university students in Malaysia. *Eurasian Journal of Educational Research, 82*, 137-167. https://doi.org/10.14689/ejer.2019.82.8

Robnett, R., Chemers, M., & Zurbriggen, E. (2015). Longitudinal associations among undergraduates' research experience, self-efficacy, and identity. *Journal of*

Research in Science Teaching, 52(6), 847-867. https://doi.org/10.1002/tea.21221

Schunk, D. H., & Pajares, F. (2010). Self-efficacy beliefs. In P. Peterson, E. Baker, & M. Barry (Eds.), *International Encyclopedia of Education* (3rd ed., pp. 668-672). Elsevier. https://doi.org/http://dx.doi.org/10.1016/B978-0-08-044894-7.00620-5

Seng, C., Carlon, M. K., & Cross, J. (2020a). Research self-efficacy of Cambodian undergraduate students at province-based universities. *International Journal of Sociology of Education, 9*(2), 154-190. https://doi.org/10.17583/rise.2020.4267

Seng, C., Carlon, M. K., & Cross, J. (2020b). Short-term information technology training impact on research self-efficacy of undergraduate students at provincial Cambodian universities. *International Journal of Learning and Development, 10*(1), 88-112. https://doi.org/10.5296/ijld.v10i1.16206

Tiyuri, A., Saberi, B., Miri, M., Shahrestanaki, E., Bayat, B. B., & Salehiniya, H. (2018). Research self-efficacy and its relationship with academic performance in postgraduate students of Tehran University of Medical Sciences in 2016. *Journal of education and health promotion, 7*, 1-6. https://doi.org/10.4103/jehp.jehp_43_17

Usher, E., & Mamaril, N., & Li, C., & Economy, D., & Kennedy, M. (2015). *Sources of self-efficacy in undergraduate engineering* [Paper presentation]. 122th ASEE Conference and Exposition, Seattle, USA. http://dx.doi.org/10.18260/p.24723

van Blankenstein, F. M., Saab, N., van der Rijst, R. M., Danel, M. S., Bakker-van den Berg, A. S., & van den Broek, P. W. (2019). How do self-efficacy beliefs for academic writing and collaboration and intrinsic motivation for academic writing and research develop during an undergraduate research project? *Educational Studies, 45*(2), 209-225. https://doi.org/10.1080/03055698.2018.1446326

Wright, A., & Holttum, S. (2012). Gender identity, research self-efficacy and research intention in trainee clinical psychologists in the UK. *Clinical Psychology & Psychotherapy, 19*(1), 46-56. https://doi.org/10.1002/cpp.732

Yantraprakorn, P., Darasawang, P., & Wiriyakarun, P. (2013). *Enhancing self-efficacy through scaffolding*. [Paper presentation]. 3rd International Conference on Foreign Language Learning and Teaching. Bangkok, Thailand.