Exploration of a Technology-Enhanced Self-Regulation Training Model for Enhancing EFL Students' Academic Writing Skills and Self-Regulated Writing Capacities in the Vietnamese Tertiary Context

by

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the Degree of Doctor of Philosophy

Statement of Originality

I, TRAN, Thi Thanh Thao, hereby declare that I am the sole author of the thesis and the material presented in this thesis is my original work except those indicated in the acknowledgement. I further declare that I have followed the University's policies and regulations on Academic Honesty, Copyright and Plagiarism in writing the thesis and no material in this thesis has been submitted for a degree in this or other universities.

Abstract

In recent years, the widespread integration of technology in higher education has afforded English as a Foreign Language (EFL) learners numerous opportunities, such as multicultural learning environments, authentic learning resources, learning support, and the facilitation of positive learner identity construction (Thorne et al., 2009; Zhao & Lai, 2007). Nevertheless, the abundance of online learning tools and students' proficiency in digital skills do not necessarily correspond to heightened learning motivation, engagement in new learning spaces (Stockwell & Hubbard, 2013), or the sophisticated and successful use of technology for language learning (Lai & Gu, 2011; Winke et al., 2010). It has been posited that language learners may fully capitalize on the wealth of online materials when guided to develop their self-regulation capacities in technology-supported language learning.

This thesis presents a self-regulation training model designed to augment learners' self-regulatory capacities in a technology-supported academic writing course. It also assesses the impact of the technology-enhanced self-regulation training program, which is based on this model, on (1) learners' writing performance and (2) writing self-regulation capacities in technology-assisted language learning environments. The proposed training model encapsulates three key components of support related to self-regulated learning in writing skills, delineating the nature of the self-regulation process as it transitions from other-regulation to self-regulation levels. These components consist of (1) affective support, (2) learning support, and (3) collaborative learning support.

The research was conducted at the University of Foreign Languages and International Studies in Vietnam, employing a mixed-methods approach. A total of 78 English-major students

participated in the 15-week training program. Initially, the participants were categorized into experimental and control groups, after which they completed a pre-test and post-test of essay-writing in weeks 1 and 15, respectively. Additionally, they were required to complete to pre- and post-Likert-type self-regulated learning questionnaires to assess their perceived changes in writing self-regulation skills. Subsequently, 20 students from the experimental group were selected for focus group interviews to corroborate the quantitative findings.

Quantitative data gleaned from the pre-tests and post-tests demonstrated the effectiveness of the technology-enhanced self-regulation training course in enhancing EFL students' writing competence in overall writing scores, sub-scores of writing performance, and three dimensions of lexical richness. Furthermore, the quantitative data from the pre- and post-questionnaires showed participants' perceptual changes in writing self-regulation across specific constructs within the three main phases of the self-regulated learning approach.

According to the qualitative data from the face-to-face focus group interviews, the training activated other factors necessary for self-regulating learning in writing skills, including the development of writing confidence, motivation, individual writing strategies, and technology autonomy, as well as the creation of a diverse and personalized learning space in the computer-assisted language learning (CALL) setting for students. However, some negative perceptions and challenges faced by certain participants emerged from the interviews, with the most common categories being problems related to group work, the sufficiency and quality of online learning devices, as well as training activity design.

Ultimately, the findings illuminate the mediating role of self-regulation training in fostering self-regulated writing capacities, offering valuable insights for future research or teaching

practice in learner training within technology-enhanced language learning. Several pedagogical implications were provided for EFL teachers to increase the impact of the self-regulated writing training model. Recommendations for further research consist of implementing self-regulated strategy training in other language skills, or in the integration of the four language skills and employing multiple data collection instruments.

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List of Abbreviations

EFL	English as Foreign Language
CALL	Computer-Assisted Language Learning
MALL	Mobile-Assisted Language Learning
CLT	Communicative Language Teaching
SRL	Self-Regulated Learning
ZPD	Zone of Proximal Development
TESOL	Teaching English as Speakers of Other Languages
L2	Second Language
ESL	English as Second Language
SPSS	Statistical Package Social Sciences
PPP	Presentation-Practice-Production

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Chapter 1: Introduction

The study was conducted to investigate how self-regulation training supported with technology influenced English as a Foreign Language (EFL) students' academic writing skills and how the writing self-regulation capacities of students were developed after the training. This chapter provides information on the study's background, a statement of the problems, the study's purpose, its significance, and the organization of the rest of the thesis.

1.1. Background of the Study

Writing skills are an important linguistic competency of a language learner and are regarded as one of the most difficult areas for language learners (Anastasiou & Michail, 2013). In EFL learning contexts, writing turns out to be the most challenging skill compared to other language skills (Zhang & Guo, 2012) because less scaffolding is provided in the writing process (Bruning & Horn, 2000). Moreover, academic writing as a complicated and multi-dimensional procedure consists of various elements, including task environment, motivation, working memory, long-term memory, and cognitive process (Hayes, 2000). Perceiving writing as a cognitive process that can be self-regulated, there is a close association between writing competence and self-regulation (Schunk & Zimmerman, 2007). According to Zimmerman and Risemberg (1997), writing self-regulation is defined as "self-initiated thoughts, feelings, and actions that writers use to attain various literary goals, including improving their writing skills and enhancing the quality of the text they create" (p. 76). This means that self-regulation in writing skills relates to the control of the cognitions, emotions, and behaviors that learners apply to achieve their learning goals, including improving their

writing skills, maintaining their interest, and improving their writing performance (Zimmerman & Risemberg, 1997).

In addition, self-regulation is one of the crucial features required for life-long learning (Ifenthaler, 2012). Nowadays, life-long learning encourages learners to expand their learning environment outside formal educational contexts or supervised environments, especially with the assistance of technology. In EFL learning settings, formal learning is only one type of learner participation (Benson, 2008) and should be integrated with informal learning (i.e., studying outside of the classroom) (Sandberg et al., 2011). This is corroborated by the conclusion of a previous research pointing to evidence of learners' engagement in both learning environments (i.e., formal and informal learning environments), resulting in positive learning achievement (Inozu et al., 2010). Therefore, it is suggested that integrating formal and informal learning environments may lead to a maximal language learning effect (Kukulska-Hulme, 2012; Sung et al., 2015).

Technology has increasingly impacted language learning, and the Vietnamese EFL higher educational context is no exception. With the development of technology, the EFL writing procedure has gradually changed from paper-based to online, requiring EFL learners to adjust their learning strategies to self-studying or self-regulated learning processes and practices in both in-classroom and outside-classroom learning environments (i.e., blended learning). However, the concepts of "self-regulated learning" and "blended learning" are relatively new to students in the Vietnamese EFL learning context because of the dominance of examination-oriented teaching and learning methods. Considering the challenges of academic English writing learning in higher education and the prominent significance of self-regulated learning supported with technology in the language learning process (Zhu et al., 2016), self-

regulated learning should be initially introduced and taught to EFL learners in Vietnamese contexts. The current study aims to design a self-regulated writing training session with the support of technology and then examine its role in the enhancement of EFL learners' academic writing performance and self-regulation capacities in writing skills in the blended learning environment.

1.2. Statement of the Problems

Technology has rapidly increased in language education settings and has supported language learners with various potential benefits, such as multicultural learning contexts, authentic learning resources, learning scaffolding, and the support of the positive learner identity construction (Thorne et al., 2009; Zhao & Lai, 2007). As a result, a rising corpus of studies on technology-enhanced language learning has recognized the multifaceted nature of the important role of technology in language learning not only within but also beyond the classroom (Chapelle, 2010). Although the implementation of technology has extended the learning environments and facilitated the learners' self-regulation capacities, it cannot ensure that learners possess the self-confidence necessary to effectively utilize online learning tools and resources for self-regulating their education, ultimately cultivating a positive and self-fulfilling learning experience. (Stockwell & Hubbard, 2013). This means that it is crucial to help learners perceive the power of technology and help them to extend their active use of technology in educational contexts. Learners can gain greater learning motivation and engagement in a new learning space only when they are prepared with the appropriate self-regulatory capacities in technology-supported language learning (Benson, 2011; Lai, 2013; Reinders & Darasawang, 2012).

What's more, it has been indicated by many studies that active engagement in a technology-mediated language learning environment does not refer to a complex and appropriate use of technology for language learning (Lai & Gu, 2011; Winke & Goertler, 2008; Winke et al., 2010) and that learners' levels of engagement and competence in integrating technology with language learning vary dramatically (Corrin et al., 2010; Johnson et al., 2009; Jones et al., 2010; Kennedy & Miceli, 2010; Oxford, 2009). This implies that the variety of accessible online learning resources and learners' engagement with technology does not necessarily result in the active, widespread, and purposeful utilization of technology for effective language learning. The use of technology can only be beneficial for the language learning if students understand why, what, and how they should do it when involving in learning activities. Therefore, the prerequisite attitudes, knowledge, and necessary strategies or skills should be taught to maximize the language learners' engagement in technology-enhanced language learning (Figura & Jarvis, 2007; Hubbard, 2004).

Much recent research contributes to the agenda for learner preparation in technology-enhanced language learning contexts in receptive skills (Romeo & Hubbard, 2011; Zenotz, 2012; Ranalli, 2013), in a small-group collaborative learning environment (Rott & Weber, 2013), in the distance learning via online communication (Heiser et al., 2013), in a receptive learning environment (Lai et al., 2016), and under the support of social networking sites (Prichard, 2013; Reinhardt & Zander, 2011; Tran, 2018). However, limited research has explored the development of a theoretical model that employs learner training to enhance students' self-regulation capacities in productive language skills within technology-supported language learning environments, particularly in blended academic writing courses at the tertiary education level. In addition, although the research area of learner preparation toward self-regulated learning has emerged and generated a rapidly growing line of research,

insufficient research has focused on how learner training fosters language students' self-regulation capacities, encompassing not only affective and learning support but also considering the perspective of collaborative learning within a blended training course. Last but not least, writing is viewed as one of the most difficult language skills, with numerous obstacles for EFL learners to overcome while writing in a foreign language. The writing process, as a complex activity, necessitates a certain level of language knowledge, strategic skills, and knowledge related to vocabulary and grammar. According to previous action research, although several practical strategies were aimed to foster writing skills, students were likely to maintain negative behaviors toward their writing and the writing methods they used (Yavuz & Genc, 1998). They still have a fear of making errors and low degrees of motivation and writing self-efficacy. Merely identifying the students' writing problems and increasing their awareness of self-regulated strategy use through pedagogical training is not enough. It is advised that self-regulation strategies in writing skills should be trained for students in order to become more autonomous and competent writers with the support of technology.

In order to address the aforementioned research gaps, the purposes of the current study are discussed in detail in the following section.

1.3. Purposes of the Study

Students are required to manage their studies and play an active role in designing their learning plan and outcomes in the technology-supported language learning environment. To enhance the language learning experience, self-regulated learning competence should be

activated. That is why the study of self-regulation training in language education should be undertaken.

The aim of this study is to design a technology-enhanced self-regulated training model in academic writing skills and further examine its potential role in improving EFL students' academic writing performance. In addition, it investigates the influence of self-regulation training model on students' self-regulated writing capacities.

The objectives of the current study are as follows:

1. To build up a technology-enhanced self-regulation training model in writing skills;
2. To examine how technology-enhanced self-regulation training improves EFL learners' individual writing performance and
3. To understand how technology-enhanced self-regulation training facilitates EFL learners' developmental process in self-regulation capacities.

1.4. Significance of the Study

The current research may shed light in informing both students' learning and teachers' teaching in language education. The foremost theoretical contribution of this study is its exploration of the interplay between self-regulated writing training and EFL learners' writing performance, as well as their self-regulated writing skills within the context of technology-enhanced language learning. This novel investigation enriches the existing literature with fresh insights into an underexplored area.

The second theoretical contribution lies in the augmentation of substantive evidence supporting the benefits of self-regulation training. The findings from this study reinforce the case for its widespread application in language education, strengthening its theoretical basis for potential large-scale implementation.

From a methodological perspective, this research stands to equip language educators with a deeper understanding of the potential impact of self-regulation training. The findings can serve as a guide for language researchers and educators, fostering an enhanced awareness of the significant role self-regulation training can play in language education.

In terms of practical implications, this research holds substantial promise for language learning and teaching in Vietnam. The insights gleaned from this study can directly inform teaching methods, potentially revolutionizing the effectiveness and efficiency of language education in the Vietnamese context or other similar countries/regions.

1.5. Scope of the Study

With consideration of the importance of self-regulation training supported with technology in the Vietnamese language learning context, the current study was conducted at Hue University of Foreign Languages and International Studies in Vietnam to examine the impact of self-regulation training in improving EFL learners' academic writing competence and their self-regulated learning capacities in writing skills. Students from Hue University's Department of English were chosen to take part in the study. The teaching approach currently used in most English department language classrooms involves the integration of four language skills, with each skill taught using the communicative language teaching (CLT) paradigm. Essay-writing

tests, a Likert-scale self-regulated learning questionnaire, and face-to-face focus group interviews were employed to explore how the self-regulated writing training facilitated the learners' improvement of academic writing performance and their self-perceived improvement of self-regulation capacities in writing skills in the CALL context. Although it is a difficult undertaking for the students in the current study to modify their own learning styles or cultures to satisfy the requirements of a new learning context (i.e., CALL environment), the training framework can serve as a reference source for EFL teachers, educators, and curriculum designers in Vietnamese language learning contexts or other contexts sharing the same learning characteristics as those in Vietnam. Then, EFL teachers are expected to appropriately modify their teaching practices to some extent to improve the effectiveness of self-study or self-regulation as life-long learning experiences and take advantage of the technology use for language learning.

1.6. Organization of the Thesis

The thesis consists of seven chapters. Chapter 1 mainly provides a general background of the study and issues related to self-regulation in language learning. The purpose and significance of the study are also discussed. Chapter 2 discusses a comprehensive review of the literature, including self-regulation theory and the role of self-regulation in language learning, self-regulation in the CALL environment, and writing self-regulation training. The research framework and research questions (RQs) are also described. Chapter 3 provides the research methodology using a mixed quantitative and qualitative research method design. It presents information on the research context, the participants, the training program, the instructional materials for the experimental and control groups, and data collection instruments. The procedures for collecting and analyzing quantitative and qualitative data are also described.

Chapter 4 provides a description of the pilot study, including its context and purpose, methodology, and results. The suggested improvement in the main study is also discussed. Chapter 5 reports the quantitative and qualitative data findings to address the two RQs, respectively. Chapter 6 summarizes the findings and presents a discussion about the main results of the research. Several pedagogical implications are also recommended. Finally, a conclusion and some suggestions for future research are offered for EFL teaching in Chapter 7.

Chapter 2: Literature Review

The above introduction has presented the general background knowledge of the study. In this section, the literature review begins with a review of self-regulation theory, the self-regulation process, and the socio-cultural framework for mobile technology-mediated second language (L2) learning. Then, it elaborates and analyzes the research found in the literature related to self-regulation training in language learning, followed by several previous studies that are central to the impact of self-regulated writing training in the CALL context. Next, it outlines the conceptual framework for the current study. Finally, a summary of the research gaps in the literature leads to the objectives of the study realized by two main RQs.

2.1. Academic Writing Learning and Teaching

Learning and teaching academic writing has been receiving increasing interest in tertiary education. According to Villalón et al. (2015), academic writing paradigm can be defined as the process of "writing to learn" academic knowledge, concepts, and ideas. In other words, student writers should be confident and capable enough to search for relevant information, ideas and/or arguments, and then effectively organize deductive reasoning and arguments to write a synthesis composition. Therefore, learning academic writing can be a complex, demanding, and challenging activities, especially for those who are anxious about their writing skills, lack confidence and motivation in their language abilities, or possess inadequate knowledge and/or strategies to organize ideas or arguments into an essay (Tseng & Wang, 2023).

Some L2 researchers have suggested a number of writing models. Following Hayes and Flower (1980), the earliest writing model refers to multiple mental features including planning (e.g., goal setting, generating ideas, and synthesize ideas), translating learning plans or goals into text, and reviewing (e.g., reading and editing) that competent writers should needs for their writing. In addition, the writing model of Kellogg (2008) focuses on "a high degree of cognitive control over the maintenance of multiple representations of the text as well as planning conceptual content, generating text, and reviewing content and text" (p.1). Another writing model of Hayes (2012) emphasizes on control processes of writers including goal setting for outlining, drafting, and revising, as well as task schemas for understanding the way to edit their writing work and synthesize in writing.

These three above-mentioned writing models frame writing as a demanding process which involves multifaceted interactive stages of strategic features in cognitive process (e.g. idea brainstorming, drafting, revising, and editing), metacognitive regulation (e.g., evaluation and self-control), and motivational control (e.g., interest maintenance and goal-directed control) (Csizer & Tank, 2017; Harris & Graham, 2009; Teng & Zhang, 2018). These processes of writing learning require a high level of personal regulation as writing tasks are normally self-directed and self-regulated activities (Zimmerman & Risemberg, 1997). In other words, becoming a proficient writer demands an individual to possess a sufficient degree of self-regulation skills and/or strategies. Therefore, the theory of self-regulation and self-regulatory processes were employed to lay the foundation for the design of self-regulation training model in academic writing skills in this study, which will be discussed in the following section.

2.2. Theory of Self-Regulation and Self-Regulatory Processes

2.2.1. Self-Regulation

Self-regulation has been identified as a vital component that supports improved language competence in language education (Oxford, 2011; Bai, 2018). According to Zimmerman (2000), the self-regulation of learning is as a self-directed learning process in which learners control their efforts, ideas, and emotions to effectively achieve their learning goals. More specifically, students transformed their own mental powers to acquire academic skills by creating their own learning goals and directing their cognition, motivation, and behaviors towards those goals. As a result, highly self-regulated learners exhibit a variety of distinguishing traits. To begin, they should be adaptable in a variety of learning settings in order to (1) set the learning goals, (2) flexibly select appropriate learning strategies to achieve their goals, (3) effectively manage learning resources, (4) extend efforts, (5) respond to feedback, and (6) successfully produce learning achievements (Boekaerts & Corno, 2005). Second, the learners were positive in terms of improving their intrinsic motivation to learn and indicating a high degree of self-confidence in completing learning goals (Boekaerts & Corno, 2005; Zimmerman, 2000). Third, the self-regulated learners took the initiative to manage their efforts based on self-evaluation and self-reflection on their own strengths and weaknesses (Zimmerman, 2002).

In this vein, the self-regulated learning process identified in social cognitive theory comprises three sub-processes, including self-observation, self-judgment, and self-reaction (Bandura, 1986; Zimmerman, 1989). Previous studies have stated that learning outcomes were influenced by the presence or absence of these sub-processes (Adiguzel & Orhan, 2017;

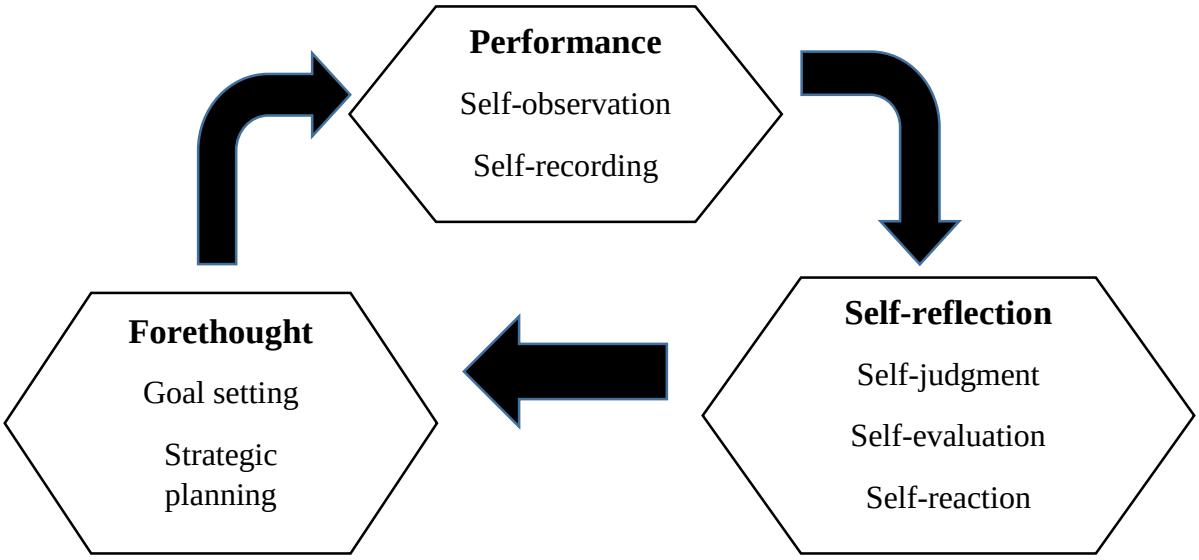
Barnard-Brak et al., 2010; Schunk & Zimmerman, 1994, 1998). Self-observation, as the most significant sub-process, deals with students' systematically managing their own personal cognitive features to seek the cause of personal learning events (Zimmerman, 2002). While self-judgment is defined as the self-managing and self-evaluating of one's learning outcomes with a specific standard or objective (Zimmerman, 1989), self-reaction refers to the individual responses to the learners' performance (Zimmerman, 1989).

2.2.2. Self-Regulation Process

Zimmerman (2000) also refers to the three sub-processes of self-regulated learning via a three-phase cyclic model of Zimmerman (1998). The first phase is the "forethought phase," consisting of the processes of goal setting or strategy planning and self-motivation. This phase focuses on observing self-regulation competency at the cognitive and motivational levels. In this phase, the specific targets and strategies for learning tasks or activities are set and planned (Pintrich, 2000). While the second phase, called the "performance phase" or "volitional control," refers to the self-instruction, self-control, self-observation, and self-recording of the learning tasks established in the forethought phase, the "self-reflection phase" includes the processes of self-judgment, self-evaluation, and self-reaction. In this phase, learners are advised to self-evaluate the learning process by comparing their performance with the standard objectives or goals and then adjust their learning strategies and skills for future learning activities (Barnard-Brak et al., 2010). The self-regulation model adapted from Zimmerman (1998) is illustrated in Figure 1.

Figure 1

Self-Regulated Learning Three-Phase Cyclic Model and Its Sub-Processes



Note. Adapted from Zimmerman (1998, p. 83)

The researcher suggested the integration of Zimmerman's (1998) three-phase cyclic model into the design of the self-regulation writing training for this study to enhance the academic writing performance and self-regulated writing abilities of EFL students. This is premised on the compatibility between Zimmerman's (1998) self-regulated learning model, which includes the forethought, performance, and self-reflection phases, and the dynamic, cyclical nature of the writing learning process. This writing learning process encompasses planning (such as brainstorming, setting goals), drafting (like text generation), and reviewing (including revisions). Correspondingly, the three phases of Zimmerman's model function as follows:

1. Forethought Phase: Students scrutinize the task requirements, setting goals and outlining strategies.

2. Performance Phase: Students monitor and regulate their writing progress.

3. Self-reflection Phase: Students assess their goal achievement and modify their writing strategies for future tasks.

In essence, this alignment suggests that Zimmerman's model could be a potent tool in improving EFL students' writing efficacy and self-regulation.

Despite the growing adoption of advanced technologies, a significant number of EFL learners find it challenging to adapt to technology-mediated learning environments. This struggle can be attributed to their limited use of self-regulated strategies and self-regulation processes (Azevedo et al., 2004), as well as the lack of confidence in their self-study strategies outside the traditional classroom setting (Kondo et al., 2012). It is crucial to understand that students often find it difficult to independently develop self-regulatory skills in a technology-enhanced language learning environment. As a result, the involvement of other agents or participants—like peers, teachers, and learning resources—becomes indispensable for EFL learners seeking to improve their self-regulation abilities, especially during the initial stages. In essence, the transition from relying on external regulation to achieving self-regulation should be a gradual process. With this in mind, the research framework of this study has been structured around the socio-cultural framework for mobile technology-mediated L2 learning (Ma, 2017). This framework, inspired by mediation theory and discussed in the following section, offers a valuable guide for structuring the research framework of this PhD study.

2.3. The Socio-cultural Framework for Mobile Technology-Mediated L2 Learning

2.3.1. Mediation

Based on the social-constructivist theory of learning (Vygotsky, 1978), learners and their classmates implicitly and/or explicitly mediate each other's learning process when they work in groups or communities to complete a mutual learning task. This procedure possibly supports learners and their classmates in advancing through their zone of proximal development (ZPD) (Lee, 2008). Following Vygotsky's viewpoint, ZPD was compared as the distance between learners' "actual developmental level as determined by independent

problem-solving" and their "potential development as determined through problem-solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p. 86)

Mediation or other-regulation was viewed as one of the significant and interrelated constructs in Vygotsky's (1978) social constructivist theory of learning. Lantolf and Thorne (2006) indicated that mediation is defined as a procedure in which individual learners, language teachers, and educators regulate other learners' or their own social and mental abilities through "culturally constructed artifacts, concepts and activities" (Vygotsky, 1978, p. 79). Each individual learner was supposed to be firstly mediated by other social agents, group members, and learning tasks, which were compared as other-regulation activities. Thanks to students' social interactions, the self-regulated learning skills gradually became internalized and developed so that the students were more confident regarding self-control or self-mediating their cognitive functions and their learning process, which were compared as self-regulation activities (Vygotsky, 1986).

Social interaction and collaborative learning activities gives EFL students more opportunities to co-construct language knowledge. For instance, collaboratively working on writing skills is a process in which students enhance their cognitive development and allows them to achieve their potential level of functioning (Neumann & McDonough, 2015). Furthermore, each individual learner possesses their own different language abilities; therefore, they are supposed to share their language knowledge or abilities with their peers in their distinctive learning style to reach the required learning objectives (Donato, 2004; Kim, 2008). Consequently, EFL learners can construct their language knowledge and then accomplish their potential level of functioning (i.e., ZPD) so that they can self-regulate their learning process. In the current study, the researcher applied this language learning theory to the

design of a self-regulated writing training to engage the participants in co-constructive writing tasks.

2.3.2. Socio-Cultural Theory

Socio-cultural theory has become increasingly popular in L2 acquisition since the early 1990s. The theory has provided evidence that humans do not "establish a direct relationship with the world, but that this relationship is mediated through the use of tools" (Guerreo Nieto, 2007, p. 215). This draws on Vygotsky's mediation theory. In language learning, on one hand, the term "tool" refers to a "physical tool" as in the literal meaning. On the other hand, it can be understood as psychological tools, such as language, explanation, and numbers. People use these psychological tools to communicate with others and carry out several social activities, such as language learning. It is also considered that assistance offered by others (i.e., other assistance) supports learners in reaching their ZPD or improving their language learning outcomes.

With their increasing popularity, technologies also have been viewed as a significant mediating tool for language learning (Thorne, 2008; Warschauer, 1997). The flexibility of current technology applications has led to many positive changes in the language learning process. First, it promotes more frequent technology-enhanced interactions between language learners and other social agents. Secondly, it greatly extends the language learning environment from a formal to an informal classroom. Finally, thanks to an easily accessible internet connection, language learners can quickly access rich online materials as authentic language input, which shapes their personalized learning approaches and learning paths.

2.3.3. Socio-Cultural Framework for Mobile Technology-Mediated L2 Learning

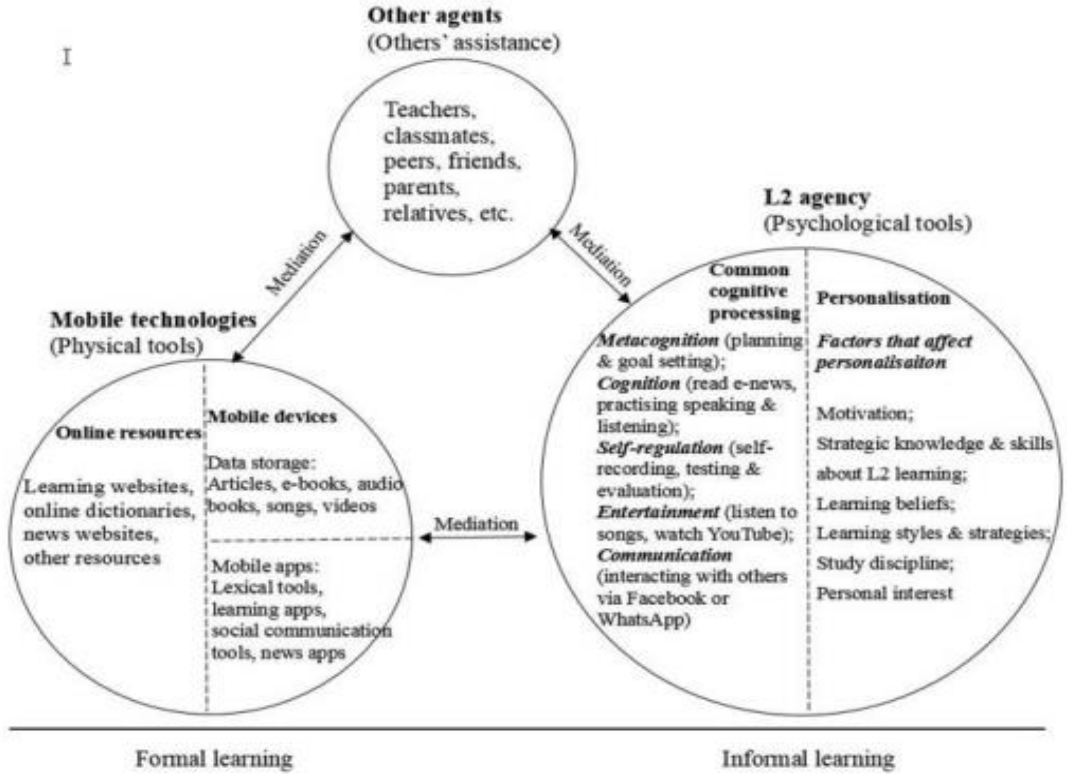
In her research, Ma (2017) carried out a multi-case study exploring the mediation role of mobile technologies in language learning of a group of Hong Kong university students. The study aimed to construct a new socio-cultural framework to capture the main components of mobile technology-mediated L2 learning and to examine the dynamism and interaction among the components.

Ma's (2017) framework was based on the mediation theory in socio-cultural theory supported by several researchers (Lantolf & Thorne, 2007; Thorne & Tasker, 2011) and the results of her multi-case study. The framework consists of three main components compared as three important mediation tools learners use to mediate language learning: (1) L2 agency (psychological tools), (2) mobile technologies (physical tools), and (3) other agents (others' assistance). While psychological tools refer to language and cognitive activities that learners apply to mediate their language learning (e.g., metacognition, cognition, self-regulation, entertainment, and communication), physical tools are the use of various mobile devices and online resources to mediate language learning. The others' assistance delivered by other social agents, such as instructors, peers, friends, and relatives, supports students in achieving their language learning progress. Their cognitive activities are influenced by motivation; strategic knowledge; and skills about language learning, learning beliefs, styles and strategies, study discipline, and personal interest, which contribute to shaping personalized language learning. In the framework, language learning not only occurs in a formal classroom or organized courses but also moves to an informal classroom, outside-classroom learning through entertainment activities and personal interests without the barrier of time and space.

The social-cultural framework for mobile technology-mediated L2 learning cited from Ma (2017, p.195) is illustrated in Figure 2.

Figure 2

Socio-Cultural Framework for Mobile Technology-Mediated L2 Learning



Note. Cited from Ma (2017, p. 195)

2.4. Self-Regulated Learning and Its Role in EFL Students' Learning

Self-regulation of learning is defined as their systematic efforts to control the learning process to achieve learning objectives (Zimmerman & Schunk, 2011). Self-regulation is one of the most powerful educational theories for explaining students' learning accomplishment because it consists of several features, such as goal setting, specific learning strategies, and metacognitive strategies (Panadero et al., 2017). When dealing with a learning activity, self-

regulated learners actively establish learning goals and express their involvement to achieve the goals (i.e., planning the goals and task strategies, self-managing the process, and self-evaluating the learning performance) (Cho et al., 2017).

Much research has mentioned the significant role of self-regulation in language learning (see Dornyei & Ryan, 2015; Lai & Gu, 2011). Previous research has explored the strong association between self-regulation and specific areas of language learning, including vocabulary acquisition (Tseng et al., 2006), reading comprehension (Chen et al., 2014), writing competence (Bai & Wang, 2020, 2021), self-efficacy (Su et al., 2018b), and students' learning motivation (Noels et al., 2000). Moreover, some previous studies have further indicated the positive impact of learners' self-regulation processes in technology-supported learning settings (Zheng et al., 2016) and in technology-enhanced collaborative learning (Jarvela et al., 2016; Su et al., 2018a).

Moreover, previous research has explored the association between learners' self-regulation and their behaviors toward online learning (Kuo et al., 2014; Liu et al., 2014). The empirical results showed that self-regulated learning and students' perceptions were closely connected in that a great level of self-regulation promoted students' behaviors and preferences in online learning experiences at many different levels of education. For instance, Puzziferro's (2008) research reported a significant correlation between self-regulated strategies relating to meta-cognitive self-regulation, time management, learning space, as well as student satisfaction level. In Kuo et al.'s (2014) research at both undergraduate and graduate levels, the findings revealed self-regulated learning strategies as a positive predictor of learners' behaviors and satisfaction in online learning contexts. In a similar vein, at the level of high school online EFL learning programs, it was found that an increased use of self-regulated learning

strategies resulted in the improvement of learners' satisfaction and perceived study progress (Lai et al., 2016b). In their recent research, Cho et al. (2017) mention the positive role of self-regulatory learning strategies in students' perceptions of online collaborative learning. The findings revealed that learners with high level of self-regulated learning expressed a stronger sense of community of inquiry compared to those low in self-regulation.

Most prior research has primarily emphasized the influence of technology on language learning within classroom instruction (An et al., 2020). It is argued that more studies are required to examine the effectiveness of self-regulated learning supported by technology on developing language skills. Among the limited number of previous research that investigated self-regulated learning with technology support, most highlighted the positive association to language learning achievements. Overall, previous studies have shown that learners with a degree of self-regulation normally outperformed those with a low degree of self-regulation in computer-based learning environments (see Azevedo et al., 2004). For example, self-regulated learning not only provides students with flexible learning environments but also develop their language learning performance and motivation with the support of technology (An et al., 2020). Moreover, a recent study conducted by Öztürk and Çakiroglu (2021) examined the impact of self-regulatory strategies between two groups of university students, those with and those without self-regulated learning in a flipped classroom. The findings showed that self-regulated learning strategies facilitated the students' English speaking, reading, writing, and grammar. Similarly, Zhu et al. (2016) found that students with self-regulatory capabilities promoted learning outcomes in the blended classroom. In contrast, Sun and Wang's (2020) study reported the infrequent use of self-regulated learning strategies among 391 second-year Chinese EFL students in writing skills although they perceived a significant contribution of self-regulated learning strategies to the prediction of students'

writing proficiency. The low frequency of using self-regulated learning strategies in writing practice was explained by the big classroom size and class time constraint.

In conclusion, the aforementioned studies have indicated the important role of self-regulated learning in language learning. Although the studies have shown the positive impact of self-regulated learning in various learning spaces (e.g., blended learning, flipped learning, and technology-enhanced language learning settings), most of them focused merely on the association between self-regulated learning and students' learning behaviors. A small number of studies also investigated the impact of self-regulated learning in increasing language skills in EFL classrooms. However, they mostly focused on developing receptive language skills (reading, speaking, and vocabulary). There is a lack of research related to self-regulated learning in writing compared to other language skills. In addition, self-regulation is trained in language classroom contexts (Cleary & Zimmerman, 2004; Schunk, 1998; Zimmerman, 1989). Therefore, it is crucial to explore whether self-regulation training is beneficial for university students regarding their academic writing skills. The following section of the chapter will discuss writing self-regulation training in the CALL environment.

2.5. Self-Regulation Training in the CALL Context

2.5.1. Self-Regulation Training

Pedagogical training was recommended as learner preparation before self-regulation practices in real-life situations (see Hubbard, 2004; Zimmerman, 1998). Therefore, several successful self-regulation training models have been recommended in language teaching areas. Some previous studies have highlighted that teachers or instructors were advised to transfer

knowledge from self-controlling, goal setting, and self-management to self-reflection during the training (Hubbard, 2004; Schunk, 1998; Stoeger & Ziegler, 2008). For example, knowledge transfer can be carried out in many different ways, such as via the provision of adaptive instruction, guided practice, modeled assistance, demonstrations, and training reinforcement (Bell & Kozlowski, 2002; Hubbard, 2004; Zeidner et al., 2000) as well as via the use of diary logs of self-regulation events, setting sub-goals, additional learning tasks and collaborative debriefings (Hubbard, 2004; Zimmerman, 2008).

2.5.2. Self-Regulation Training and CALL

Long before the appearance and increased popularity of modern learning-related technology, Zimmerman (2002) had mentioned that EFL learners did not possess enough skills and/or strategies to self-manage their academic learning. When technological advances occurred as an alternative learning channel, self-regulated learning in CALL was expected to bring EFL students more personalized pre-class preparation, in-class learning, after-class extended practice, and/or online discussion via online platforms and applications (Tan, 2019). However, there was a mistaken belief that EFL learners would effectively and successfully apply the technological features delivered by the software (Fischer, 2007). Learners self-regulated their language learning by using software features or technological applications differently that initially predicted by program creators (e.g., Hwu, 2003) and with a minimal frequency (Fischer, 2007).

In addition, when mobile learning emerged as one of the learning approaches, it was assumed that instructors would need to modify their teaching strategies and teaching practices in language classrooms (Golonka et al., 2014). Students, in turn, were required to modify their

self-regulated language learning and practices necessitated by various new technological devices (Cancino & Panes, 2021). However, it has been reported by much previous research that EFL students often struggled in technology-supported language learning contexts (Hadwin & Winne, 2001; Hromalik & Koszalka, 2018; Lajoie & Azevedo, 2006) mainly due to a lack of self-regulated strategy use and low levels of self-regulatory strategies (Azevedo et al., 2004). Other studies have revealed that learners' lack of self-confidence in their own self-regulated learning skills was one of the main reasons why they fail to self-monitor and self-manage their out-of-class learning (Hunter-Blanks et al., 1988; Kondo et al., 2012).

These problems led to concerns about the self-regulation training in technology-enhanced language learning in education. First, EFL students were offered various opportunities to boost their improvement of self-regulated learning capacities, including goal setting, time management, environment structuring, help seeking, task strategies, and self-evaluation with the support of technology (Carneiro et al., 2007; Zheng et al., 2018). Secondly, self-regulated learning abilities were considered a precursor to mobile learning, whereas mobile learning was supposed match to the features of self-regulation (Chen et al., 2008). It was believed that technological devices were flexible learning tools to convey content, increase motivation, and strengthen engagement (Sung et al., 2016) and could positively influence self-regulated learning (Sung et al., 2015). On one hand, some studies related to self-regulation stated that learners engaged in self-regulated learning tasks supported by technology beyond the classroom but not as frequently as the initial expectation of program designers (Lai & Gu, 2011). On the other hand, other studies mentioned the development of self-awareness of performance (Shih et al., 2008) and better-sustained motivation and self-study perceptions (Kondo et al., 2012).

2.5.3. Self-Regulation Training in Writing Skills

According to Zimmerman and Risemberg (1997), writing self-regulation is defined as "self-initiated thoughts, feelings, and actions that writers use to attain various literary goals, including improving their writing skills as well as enhancing the quality of the text they create" (p. 76). This means that self-regulated writing refers to writers' monitoring of cognitions, emotions, and behaviors to increase their performance, sustain engagement, and then develop their writing proficiency (Zimmerman & Risemberg, 1997). Moreover, writing activities normally require learners to be "self-planned, self-initiated, and self-sustained"; therefore, they require a great deal of writing self-regulatory strategies, which could contribute to developing learners' writing outcomes (Zimmerman & Risemberg, 1997, p. 73).

Zimmerman and Risemberg's (1997) social cognitive writing model states that writing self-regulation consists of environmental, behavioral, and personal categories. While the environmental category refers to manipulating context to facilitate writing activities, behavioral writing self-regulation involves writers' self-controlling, self-evaluating, and self-verbalizing writing. Finally, the personal category of writing self-regulation refers to writer's utilization of cognitive and affective strategies to tackle writing activities. All these categories supported EFL student writers to accomplish a specific writing proficiency.

Despite the substantial literature suggesting the important role of self-regulation training for life-long learning or for self-study in education, little of the available literature investigated the effectiveness of technology-enhanced self-regulation training on EFL students' improvement of writing competence and of writing self-regulation capacities. Some previous

studies exploring the influence of self-regulation training on the writing outcomes of EFL learners are presented in the following section.

2.5.4. Previous Studies Investigating the Impact of Self-Regulation Training on Language Learning

Much research has revealed that self-regulated learning is thought to be trained and enhanced via learning experiences (Andrade & Evan, 2012; Oxford, 2011). In his study, Lam (2015) conducted a 15-week process-oriented English writing course. The study found that explicit instructions linked to self-regulatory strategies played a substantial influence in enhancing learners' self-regulation skills throughout various stages, including planning, idea management, and problem-solving skills in the writing process. When applying the aforementioned writing process at the school context, Tseng et al. (2015) indicated that instructors' adequate scaffolding is important in boosting English language learners' self-regulation capacity. Teachers should provide suitable guidance by instructing students on necessary learning strategies, establishing their metacognition, and improving their self-efficacy. Much research has been carried out to investigate the significance of self-regulation instructions and strategies in developing self-regulated learning capacities; however, more research evidence of how they work in technology-enhanced language learning is still needed.

The studies on adopting self-regulated learning supported by technology-enhanced language learning environments have yielded conflicting results. On one hand, students regarded technology as a physical tool that could be used to supplement their language learning experiences beyond the wall of the classroom (Inozu et al., 2010; Lai & Gu, 2011; Murray,

2008). Active engagement in an online learning context, on the other hand, did not adequately ensure effective and successful use of mobile technologies for language learning (Lai & Gu, 2011; Winke & Goertler, 2008; Winke et al., 2010). This indicates that the current use of available technological apps or online learning resources does not result in an adequate understanding of their effective use (Kennedy & Miceli, 2010; Oxford, 2009). As a result, more researchers concentrated their efforts on how to develop and improve appropriate competence in the active and effective use of technical support in language classrooms (Cohen & White, 2008; Hubbard, 2005; Hubbard & Romeo, 2012; Levy, 2009).

Although the need for self-regulation training has been explored in language learning (Barrette, 2001; O'Bryan, 2008; Ranalli, 2013; Romeo & Hubbard, 2011; Smith & Craig, 2013; Zenotz, 2012), little research has explicitly investigated the effectiveness of self-regulation training on EFL learners' writing competence in the CALL context. Most of the previous studies concentrated only on the impact of self-regulation training on receptive skills (e.g., listening and reading skills) and language knowledge (e.g., vocabulary). For example, technical training before CALL tasks was found to be beneficial not only to developing students' computer literacy but also to increasing their confidence and engagement with CALL tasks (Barrette, 2001). Recent research related to learner training has expanded from technical training to pedagogical and strategic training. For instance, O'Bryan's study (2008) introduced a pedagogical training program on the rationale and pedagogical implications of glossing before online reading and found it resulted in more positive attitudes and a higher frequency of using glossing in language learning. Similarly, previous studies have revealed that training on the effective use of Facebook as a social networking site and strategies for applying Facebook for language learning promoted a higher frequency of Facebook use and highlighted learners' awareness of its potential benefits in language learning (Prichard, 2013;

Reinhardt & Zander, 2011). Moreover, several previous studies showed the influence of learner training related to metacognitive reading strategies on the development of Internet reading comprehension outcomes (Zenotz, 2012), the influence of training related to web-based dictionary strategies on greater vocabulary gains (Ranalli, 2013), and the impact of self-regulated learning training model in EFL learners' reading self-regulation improvement (Morshedian et al., 2017).

In addition, Romeo and Hubbard (2011) designed a training program during 10 weeks in listening class to help ESL students increase their autonomous listening practices with the support of technology. The program focused on applying general and specific online learning tools for listening skill improvement and suggested strategies to facilitate the learning process. The results showed an improvement in learners' engagement in autonomous listening practices by the move from listening for entertainment to listening for learning. Moreover, following their research in a Japanese university, Smith and Craig (2013) delivered training through learning strategies, relevant CALL learning materials, and devices (e.g., e-learning portfolio and self-reflection diaries) to increase EFL learners' awareness and strategies for autonomous language learning. The training providing systematic continuous assistance was found to activate learners' positive perceptions of autonomous learning and their willingness to integrate more CALL resources into their future learning process.

Similarly, Lai et al. (2016b) designed a 12-week online training platform for undergraduate students to increase their engagement in the self-regulated technology use for language learning. The participants were prepared with the pedagogical rationales for the self-regulated use of technology for language learning, necessary knowledge, and relevant strategies or skills to select and apply online materials and devices more appropriately for language

learning. The findings mentioned the impact of the training in increasing students' self-regulated use of technology for language learning and in promoting their engagement, knowledge, and strategies for technology use in language learning.

According to the studies mentioned above, it is agreed that self-regulation training can be applied successfully in EFL classroom settings. Most of them examined the significance of self-regulation training in developing receptive language skills or language knowledge in the CALL context. However, writing is considered an active, productive language skill but a complex learning activity; therefore, it requires a high degree of language knowledge (e.g., lexical and grammatical knowledge) and self-regulation skills. Thus, self-regulation is crucial for becoming a proficient writer (Zimmerman & Riesemberg, 1997). This raises concern about the need for self-regulation training in developing EFL learners' writing performance. The following section will discuss self-regulation training in writing skills, followed by the influence of self-regulation training on the EFL students' development of writing performance.

2.5.5. Previous Studies Investigating the Impact of Self-Regulation Training on EFL Students' Writing Outcomes

Although substantial literature shows the impact of learning training on receptive language skills (e.g., listening and reading skills), little empirical research has evaluated whether and how self-regulation training influences EFL students' writing outcomes.

On one hand, some previous research investigated the significance of self-regulation training in developing students' writing performance in face-to-face writing classrooms. For example,

the training in self-regulated writing strategies was reported to be beneficial in increasing fourth-grade students' completeness and quality of their stories (Glaser & Brunstein, 2007) as well as in enhancing their knowledge about a high-quality writing paper and their strengthened self-efficacy beliefs in writing (Brunstein & Glaser, 2011). In the higher education language learning context, self-regulated strategy instructions for writing were effective in improving both learners' writing autonomy and their writing ability (Nguyen & Gu, 2013) as well as in producing some positive outcomes in learners' self-regulatory strategies (e.g., planning, being self-efficacious, self-monitoring, help seeking, and revising and evaluating skills), and writing skills (e.g., organization of ideas and content) (Göy, 2017). In the same vein, Bakry and Alsamadani (2015) investigated the effects of training sessions in self-regulation development strategies on improving the persuasive essay writing skills for students of Arabic as a foreign language. Results showed that participants improved their essay writing skills related to paragraph writing, ideas generation, organization, clarity of position, grammar and vocabulary.

A recent study by Raja et al. (2022) also reported the impact of scaffolding techniques on ESL learners' writing skills. The findings using a sample t-test showed that the participants in an ESL intercultural communication context had significantly higher writing scores after being trained using scaffolding techniques for writing skills (Raja et al., 2022). In addition, Teng and Zhang (2020) administered five-month self-regulated learning strategies-based writing intervention to 80 undergraduate students who were enrolled in an academic writing course in a Chinese university. Their study suggested that the self-regulated learning strategies-based instructional model helps the participants in the intervention group increase their writing scores in post- and delayed post-tests, their level of linguistic self-efficacy and performance self-efficacy, as well as become more active in deploying an array of self-

regulated learning strategies (e.g., metacognitive strategies, social behavior strategies, and motivational regulation strategies).

On the other hand, technology-enhanced self-regulation training has also played role in writing skills. Bai and his colleagues (2022) carried out a self-regulated writing strategy-based intervention supported with e-learning tools to improve primary school students' self-regulated strategy use in English writing. The changes in learners' self-regulated writing use, their motivation and their e-learning acceptance were measured through a questionnaire. The study's findings indicated that the participants improved their use of self-regulated writing strategies (i.e., planning, text-generating, monitoring and revising), increased their engagement in English writing and their e-learning acceptance for English writing. Broadbent et al.'s (2020) research found that the students in an online training course with a mobile app-based diary condition significantly improved their self-regulated learning knowledge, metacognitive strategies, cognitive strategies (i.e., explanation, organization, and high-order thinking), and strategies related to resources management (i.e., time-management and effort regulation). Similarly, Woottipong (2022) carried out a study with 86 high school students divided into experimental (i.e., regular writing class integrated with writing self-regulation training) and control (i.e., regular writing class only) groups. The findings collected from questionnaires, writing tests, and learners' reflective journals demonstrated higher writing scores and higher levels of using self-regulated strategies and of the writing self-efficacy of the participants in the experimental group than those in the control group (Woottipong, 2022).

In addition, perceiving self-regulation and scaffolding as two under-researched concepts in mobile learning, García Botero et al.'s (2021) study, including 52 students of French as a

foreign language in Colombia, examined the effectiveness of training in self-regulation and temporary scaffolding on French language skills. The participants were divided into one control group and two experimental groups. Both experimental groups participated in voluntary language learning via an online language platform, Duolingo. One of the experiments entailed self-regulation training and scaffolding for MALL.

The results of García Botero et al.'s (2021) research indicated that the students who were taught in self-regulation and received temporary scaffolding presented greatly higher involvement in online language platforms. Secondly, the study mentioned a correlation between the high frequency of using online language platforms and the development of French writing competence. Thirdly, the results showed that engaging only in voluntary outside-the-classroom MALL did not lead to higher learning outcomes (i.e., test scores) in French listening, reading, or writing skills. Finally, the study also found that the training and temporary scaffolding contributed to higher test scores in writing skills in the MALL context. Overall, the study investigated the potential influence of voluntary, outside-the-classroom MALL to complement in-class language learning. Although MALL could be a convenient and flexible platform for language education, more studies should be undertaken to examine which conditions of voluntary outside-the-classroom MALL can result in substantial learning progress. For example, alternative training and scaffolding strategies, more effective self-regulated learning components, and increased self-regulation support and approaches by language instructors and educators should be studied in future research.

To sum up, self-regulation strategy instructions for writing have been highly suggested in the literature (Boekaerts & Corno, 2005; Hammann, 2005; Zimmerman, 2008; Zimmerman & Risemberg, 1997). It can be concluded that learners equipped with knowledge about self-

regulated learning strategies possibly produce more well-organized writing work with a greater quality of content, manage learning resources (e.g., technology, library, and social assistance) more effectively, and self-reflect on their writing performance, which leads to writing improvement. Based on the need for technology-enhanced self-regulation training, this study was designed to explore how EFL learners benefit from specific tasks in self-regulated writing training to develop their writing outcomes and their self-regulated writing capacities in a blended learning setting. Therefore, approaches to designing learner training for self-regulation are presented in the following section.

2.6. Approaches to Learner Training for Self-Regulation

Learner training has been considered as a process in which language learners are assisting in constructing a knowledge and strategic skills to self-regulate their language learning more efficiently and effectively than they would without such training (Hubbard, 2013). Therefore, the term learner training closely overlaps with similar concepts, such as strategic training, learner development, and learner autonomy, but it remains vaguely defined in the area of language learning (Hubbard, 2013; Ma, 2007). According to the definition, the questions of why learners should be trained, what skills they should be trained in, and how to structure training are raised for further investigation.

2.6.1. Why Should Learners Be Trained?

It cannot be denied that appropriate preparation is significant in technology-based language learning. However, Hubbard (2004) indicated that learner training had received low priority in the CALL environment because of the following assumptions: (1) well-designed learning

tasks automatically lead to learners' successful outcomes, (2) learners can effectively use the technology tools day to day without the training, (3) learners inherently possess a high level of digital knowledge, and (4) learner training is not necessary as technology becomes normalized. Based on his research evidence, Hubbard (2004) also suggested that learner training should be a central issue in CALL practices and research due to the following reasons: (1) learners as digital natives cannot guarantee the sufficient level of learning competency required for the CALL environment; (2) research evidence has revealed that a shortage of learner training and scaffolding is one of the major reasons for unsuccessful learning experiences in the CALL environment; (3) learners' positive perceptions of learner training and the improvement of learning outcomes are shown in the CALL environment after a training; and (4) the unique features of technology standards for Teaching English of Speakers of Other Languages (TESOL) language learners make learner preparation significant in the CALL environment.

2.6.2. What Skills Should Be Taught?

Recent research has suggested that educational interventions concentrating on strengthening students' readiness, relevant understanding, and skills for self-regulated learning involvement could improve self-regulated learning (Garrison, 1997; Holec, 2009). Garrison (1997) proposed that the willingness to involve in self-regulated learning is determined by the entering motivation and the maintenance of intention. The effects of flexible strategies to deal with difficulties and/or problems in interaction with technology (Kop & Fournier, 2011), an appropriate approach to actively obtain opportunities to learn and use the language (Kormos & Csizer, 2013), and the readiness to extend the nature of informal learning outside of the school assignments (Wong & Looi, 2012) are all examples of entering motivation in the self-

regulated strategy use for language learning. Furthermore, according to Garrison (1997), the maintenance of intention is detected through learners' intrinsic motivation to take the responsibility for their own learning and could be enhanced via an in-depth understanding of learning goals and learning activity selection.

What's more, Hubbard and Romeo (2012) developed a three-stage training framework to improve students' self-regulation capacities in a technology-mediated language learning environment. Pedagogical, strategic, and technical training are all part of the training model. Pedagogical training involves the theoretical concepts and rationales underlying CALL activities and assists students in understanding the rationale for using specific approaches and processes are used to attain learning goals. Strategic training includes methods that are generally required in any learning setting as well as those that are specifically needed in technology-based language learning. Technical training strives to acquire not just general operational skills but also a thorough knowledge of specific applications related to language learning.

Reinders and Hubbard (2013) proposed in their study that learner training should include not only strategic, pedagogical training and technology use assistance, but also community building. Both instructors and learners should be taught to increase their degree of technological autonomy and learner autonomy. The learner training course's purpose is to raise students' cognitive and metacognitive understanding of language learning while also fostering a learner-learner collaborative learning environment.

Many studies, according to Lai (2013), have identified common elements to guarantee the success of technology-mediated language learning contexts, such as affective and attitudinal

support, technical support, and learning support. With respect to affective and attitudinal support, teachers should facilitate a comprehensive understanding among students about the benefits of technology-supported activities. Additionally, students should be consistently provided with effective emotional scaffolding throughout their learning journey. Technical support focuses on the features or applications that are useful for language learning. Finally, learning support refers to the supporting mechanisms, strategies, or approaches to satisfy language learning objectives and improve learning experiences or engagement.

Similarly, Lyu and Lai (2018) designed a framework for what should be taught to promote self-regulated language learning with technology. According to the framework, learner training should focus on the affective aspect, the resource aspect, and the cognitive aspect. The affective aspect refers to the initial motivation and maintenance of intention. This means that learners are trained to increase positive attitudes and effective learning methods and to understand the association between learning objectives and the relevant use of online learning resources. In addition, while the resource aspect refers to easy access to useful online learning resources and a well-prepared understanding of the appropriate digital resources for specific learning needs, the cognitive aspect focuses on not only the guidance and capacity to create quality personalized learning experiences beyond the classroom but also the capacity to apply digital learning resources for language learning.

Therefore, a training program to promote learners' self-regulation in a technology-enhanced language learning environment should focus on learners' motivation, relevant strategies, and learning community development. Accordingly, the training model should contain some basic contents such as the rationales for self-regulated learning, the use of technology for language learning, the out-of-class language learning experience and the general and specific strategies

for technology-enhanced language learning out of the classroom, the strategic capacities used to facilitate the learning process, and extended opportunities to enhance the collaborative learning experience.

2.6.3. How to Structure Self-Regulation Training?

The improvement of self-regulation skills is divided into four stages, including observation, emulation, self-control, and self-regulated stages. In the first two stages, students develop and perform specific skills under observation and with social assistance, respectively; then, they extend their practice without scaffolding in the self-control stage and eventually make adjustments to the skills depending on the outcomes (Schunk & Zimmerman, 1997; Zimmerman, 2000). Moreover, a three-phase cyclical structure is developed to encompass the four stages of development. While the observation level is covered by the forethought phase, where learners are given motivational and cognitive preparation, and the processes of goal setting and strategy planning, the performance phase consists of both the emulative and self-control levels, where students perform the learning tasks and self-manage their learning progress. Finally, the self-reflection phase focuses on the self-regulated level, in which students assess their performance in relation to the goals and then alter their performance.

Regarding CALL learner training, Hubbard (2004) developed five practice-based principles that correspond to Zimmerman's three-phase cycle model. Following his principles, Hubbard (2004) advises language instructors and educators to take a learner perspective not only to provide learners with the relevant cognitive and attitudinal preparation in an autonomous learning environment, but also to instruct them to establish the relevant CALL strategic skills via the pedagogical training before students engage in the CALL tasks. During the CALL

tasks, he emphasizes the application of a cyclic approach in which training content is categorized into small sections and in which students are offered the opportunity to explore CALL applications for a brief period of time before discussing of the strategic use of the activities for language learning purposes. After practicing CALL activities, Hubbard's principles emphasize using collaborative debriefings to maximize the effects of the training session and to encourage the extended language learning experiences through additional activities in other courses.

In addition, Randi and Corno (2000) suggested three main teaching tasks, or strategies, to promote EFL learners' self-regulation based on self-regulation processes. First, the setting of the in-class learning environment should be supportive of facilitating students to meet the learning requirements and challenges. Secondly, EFL teachers are advised to provide sufficient scaffolding instructions, such as learning strategies and techniques to complete the required tasks. Finally, teachers should encourage EFL learners to self-evaluate their performance against pre-determined criteria through self-evaluation checklists or forms. In this task, teachers should provide several instructional tasks in which EFL students are encouraged to observe and self-evaluate their own learning experience. Similarly, Schunk (1998) shared effective learner training through modeled demonstrations, guided practice, and self-regulation training via goal setting and self-reflective practice.

According to Lyu and Lai (2018), learner preparation should be carried out under the roles of teacher and resource designer. Teachers' roles are categorized into two main levels of in the classroom and at the interface between in-class and out-of-class learning (Lai, 2017). Inside the classroom, learners are guided to develop their self-regulation competency through relevant learning strategies (Zimmerman & Risemberg, 1997), through the preparation of

their mentalities (Little, 2007), and through a focus on a learner-friendly and non-controlling learning atmosphere (Elgort, 2011). At the interface level between in-class and out-of-class learning, the course objectives and classroom tasks should associate with the learners' real-life experiences beyond the classroom to construct a bridge between in-class and outside-of-class learning.

Moreover, teachers can support learners through the roles of counselor and advisor (Lai, 2013). The level of teacher support should be different and appropriate at the various stages of self-regulation skill development, such as forethought, performance, and self-reflection. In addition to the teacher roles, Lai (2017) emphasized three major principles for designing outside-of-class learning resources: (1) promote learning potentials, such as language-learning potentials and the characteristics of self-regulated and outside-of-classroom learning experiences; (2) gain the optimal interplay between in-class and outside-of-class learning; and (3) involve the learner's voice in the design process. To maximize language learning potentials and the characteristics of self-regulated and out-of-classroom learning, the learning activities need to meet the criteria of diversity and authenticity in language input and affective and cognitive involvement (Chapelle, 2001; Tomlinson, 2010); the criteria of multiple dimensions of learner control to encourage students to construct their personalized learning environment; as well as the criteria of flexible learning materials that learners can finish in a short duration of time (Lyu & Lai, 2018). To obtain the appropriate relation between in-class and outside-of-class learning, the in-class authentic resources should support and enhance students' outside-of-class learning experiences. Finally, incorporating learner's voices in the activity design guarantees that the learning resources and activities meet learners' needs.

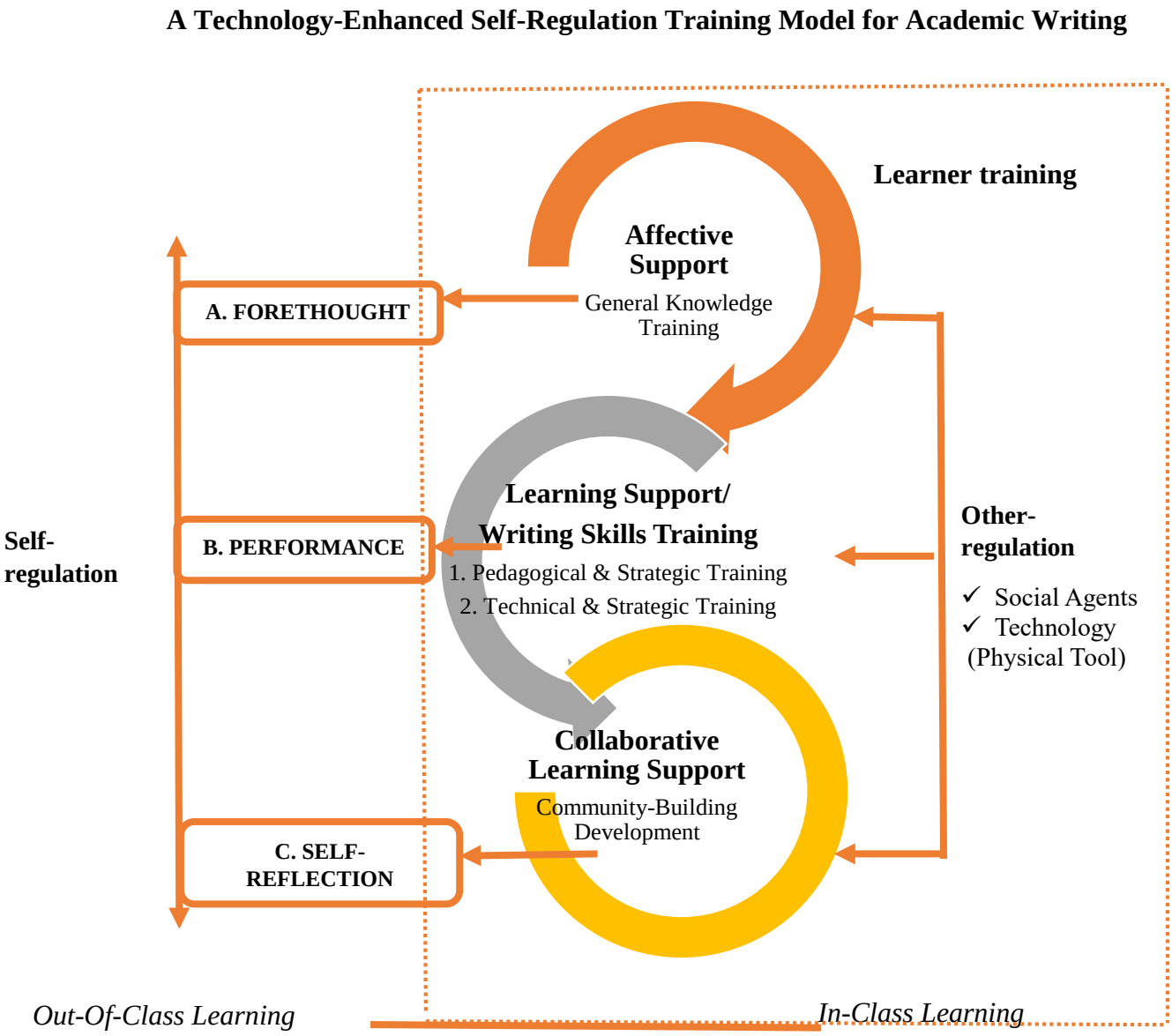
2.7. Research Framework

In view of the above-mentioned gaps and the evaluative reports of research related to self-regulation training in productive skills in the CALL context, the study aims to structure a technology-enhanced self-regulation training model primarily to develop academic writing skills in a blended learning setting (see Figure 3). The training model is inspired by Zimmerman's three-phase cyclic model for self-regulated learning (Zimmerman, 2000) and embraces Ma's (2017) socio-cultural framework for mobile technology-mediated L2 learning. As shown in Figure 3, the framework comprises three key components of support: (a) *affective support*, (b) *learning support*, and (c) *collaborative learning support*, which covers Zimmerman's three phases of self-regulated learning approach, respectively. According to the framework, *general knowledge training* considered as the affective support aims to provide learners with cognitive and attitudinal preparation prior to the learners' practice of CALL activities. This is followed by the provision of relevant strategies and/or skills for technology-enhanced writing learning (i.e., *three-part training* considered as learning support, including pedagogical, strategic, and technical training) during the CALL activities, and finally by the provision of extended opportunities for collaborative learning (i.e., *building-community development* considered as collaborative learning support) after the practice of CALL tasks. Based on Ma's socio-cultural framework for mobile-technology-mediated L2 learning (Ma, 2017), three types of learners' support are designed to be aligned with the learning environment development from a learner-friendly learning atmosphere via the "other-regulation" level, including the assistance of social agents and physical tools (e.g., teachers and peers, and mobile technologies), to a non-controlling learning atmosphere via the "self-regulation" level. The research builds up the new theoretical framework for using technology-enhanced self-regulation training in writing skills (Figure 3) and then evaluates

the proposed framework as well as the potential impacts of the learner training course in regard to improving EFL students' academic language performance and self-regulation competency in technology-mediated language learning environment.

Figure 3

A Technology-Enhanced Self-Regulation Training Model for Academic Writing



2.7.1. Learning Environments

Regarding the targeted language skill, the research aims to improve academic writing performance for second-year students in an academic essay-writing course. Although the self-regulated learning strategy use in technology-enhanced language learning was found to be a common research theme in the university context (Sockett, 2014; Sundqvist & Sylven, 2014), much research showed that language learners engage with online resources for their out-of-class learning more in receptive language skills than in productive language skills. For instance, Toffoli and Sockett's study (2010) reported that listening activities including listening to music and watching movies or TV shows were considered as the most popular ones but that learners only produced brief and personal responses rather than self-produced creative written output for writing tasks. Therefore, the proposed study is constructed to analyze the supporting and mediating roles of technology-enhanced self-regulation training in learners' academic language performance and in learners' self-regulated writing capacities. The study also tries to build a new theoretical framework for using learner training to promote self-regulation competency, especially in the productive language skills in CALL contexts. The training framework is expected to contribute to the theoretical evidence of an updated teaching practice process to enhance learners' self-regulation capacities in productive language skills in CALL contexts.

In terms of training format, the proposed program is designed to integrate in-class and out-of-class learning. Many training programs have been hosted only online on a voluntary basis outside the classroom (Heiser et al., 2013; Lai et al., 2016b). The language learning activities carried out outside the classroom were found to have various functions. They first supported learners by providing extended language learning materials and opportunities for practice. They also helped learners construct a positive learner identity, maintain their learning

interests (Lamb, 2007), and build a supportive learning community for self-expression and self-perceptions (Gao, 2009). Online voluntary training courses, however, might face the problems of minimal teacher support and learner responsibility. Even though most of the students in the younger generations can be considered digital residents, they still need assistance from other social agents (e.g., teachers, peers, and parents) to guarantee effective learning processes and outcomes (Little, 2007; Wang, 2007). Therefore, the integration between in-class and out-of-class learning in the training program is crucial to provide learners with the necessary teacher support and guidance as well as to enhance learners' mental preparation, motivation, and satisfaction, especially in the early stages of a new learning environment, such as in Vietnamese educational context.

2.7.2. Writing Self-Regulation Training Components

Affective Support. Affective support (i.e., motivational support) plays an important role as the motivating agent in self-regulated learning. Krashen (1988) argued that the low level of self-confidence and motivation or learners' fear or anxiety could elevate students' affective filters, which inevitably limits their development of language input and output. The potential effects of affective support can be summarized as facilitating and increasing learning engagement, supporting motivation, promoting authentic communication, peer scaffolding, and intercultural understanding (see Lantz-Andersson et al., 2013). In addition, it has been supported by many researchers that motivation is closely associated with the development of self-regulation capacities (Dornyei, 2005; Ma, 2017; Zimmerman, 2011). In addition, Bai and Wang's study (2021) highlighted the effects of motivational beliefs (e.g., growth of mindset and interest) on ESL/EFL students' self-regulated writing strategy use and writing performance. Therefore, the component of affective support is carried out under the

provision of general knowledge training delivered by teachers or instructors, such as the general knowledge related to language learning approaches or strategies, the rationales of self-regulated language learning, and the potential significance of technology for multiple learning purposes.

Consequently, this component aims to foster a learner-friendly, supportive, and relaxing learning environment to enhance learners' autonomy, motivation, and engagement in not only in-class but also out-of-class learning.

Learning Support. Learning support plays a role as the mediating agent in the developmental process of self-regulated learning. This support component aims to facilitate the learning process and support learners' autonomy in the technology-based language learning environment. With a focus on the development of self-regulation capacities, the model focuses on the range of training, including pedagogical, strategic, and technical training related to the processes of writing skill acquisition. It is great importance for language researchers and educators to consciously support learners to increase these relevant skills to become active and effective learners.

Researchers have investigated how pedagogical training enhances learners' positive perceptions and greater use of glossing in online reading (O'Bryan, 2008), how strategic training boosts language learning achievements (Zenotz, 2012; Ranalli, 2013), and how technical training enhances learners' digital literacy and increase learning engagement in CALL activities (Barrette, 2001). In addition, researchers have analyzed the effectiveness of a three-part training model, including pedagogical, strategic, and technical training, in

developing learners' autonomous language learning with technology (Romeo & Hubbard, 2011; Smith & Craig, 2013).

The learning support component is delivered by teachers or instructors through interactive and creative follow-up learning tasks not only inside but also beyond the classroom to maximize the practice opportunities through a variety of technologies. Therefore, the component of learning support in the proposed model aims to provide learners with essential pedagogical knowledge, relevant learning strategies, and the appropriate guidance on technology use in CALL contexts.

Collaborative Learning Support. Collaborative learning support also plays the role of a mediating agent in the developmental process of self-regulated learning. Koschmann (2002) defined technology-enhanced collaborative learning as a learning environment in which the processes of collaborative meaning-making go beyond knowledge sharing among multiple learners. Technology can play its supporting and mediating roles in the interactive procedure of collaborative meaning-making through joint activities among multiple learners and various types of interaction. In addition, research has indicated that collaborative learning discourse allows learners to work in their ZPD and build up mutual understandings, including several of the following patterns: co-construction, the incorporation of language, peer-correction, and self-correction (Foster & Ohta, 2005; Hsieh, 2017; Ohta, 2001).

Given the importance of building a learner community in a technology-mediated learning environment, the research also aims to create a collaborative community of practice in which teachers encourage students to share mutual interests and passions, practice together, negotiate new meanings, and learn from each other through collaborative learning activities

(Wenger, 2010). The training platform is constructed to create a multi-directional dialogue among learners and teachers during the training. The multi-directional dialogues between learners and learners and between learners and instructors are built by the interactive connection and collective scaffolding among them not only inside the classroom but also beyond the classroom. Therefore, the study is expected to explore the mediating role of collaborative community building or multi-directional scaffolding as a newly emerging feature to facilitate self-regulated learning in technology-enhanced language learning.

2.8. Research Questions

First, a previous literature review (Broadbent & Poon, 2015) showed that relatively inadequate attention had been paid to the influence of self-regulated learning strategies supported by technology on EFL students' academic performance, especially in blended academic writing courses in higher education. On one hand, academic writing requires complex cognitive processes that need the sufficient development of self-regulation capacities (Lam et al., 2018). Although an enormous number of studies has been carried out to explore effective practical teaching methods to improve student writing, students seem to retain negative attitudes toward their writing skills (Göy, 2017). These negative attitudes possibly result from the fear of making errors and a lack of writing self-efficacy. Therefore, the identification of students' difficulties in writing skills and the implementation of pedagogical training is needed to increase their writing motivation and their awareness of learning strategy use. However, these solutions are insufficient. According to numerous previous studies, self-regulation skills are important to help learners become more competent writers (Glaser & Brunstein, 2007; Göy, 2017; Nguyen & Gu, 2013; Raja et al., 2022; Woottipong, 2022). On the other hand, the EFL writing process has moved from paper-based

to online, which positively affects the development of cognitive strategies in writing skills with the assistance of technology (Cancino & Panes, 2021). Therefore, the role of technology mediation in self-regulated learning is also perceived as significant in better supporting learners with effective self-regulated strategy use. However, little research has explicitly investigated whether technology-enhanced self-regulation training would change EFL students' learning performance, especially in academic writing (Han et al., 2021).

Second, in Vietnamese higher education, poor academic English writing skills remain one of the key problems of university students even though that they have received more than 10 years of English instructions. Vietnamese EFL university students tend to overuse basic vocabulary and simple sentence structures in their academic writing papers. Moreover, the over-emphasis on grammatical accuracy in most Vietnamese EFL students' beliefs further reinforces this tendency. However, lexical richness is also an important indicator in assessing the quality of English academic writing (Treffers-Daller et al., 2018; Xu et al., 2019). Csomay and Prades (2018) found that the participants who used a more comprehensive vocabulary range produced higher quality essays. The question of whether technology-enhanced self-regulation training effectively promotes lexical richness in EFL learners' academic writing has rarely been investigated in previous research (Broadbent & Poon, 2015). As a result, researchers are calling for more investigations into the role of self-regulated writing training supported with technology in helping EFL students produce high-quality academic papers in multiple aspects of writing performance (e.g., overall writing performance, sub-scores of writing performance, and lexical richness). The present research aims to address this research gap by exploring a sample of Vietnamese EFL university learners with experience in self-regulation training supported with technology in their academic writing course.

The study employs a quasi-experimental design to investigate the impacts of technology-enhanced self-regulation training on L2 individuals' writing development over 15-week period. In this regard, the study attempts to: (1) examine the differences in the L2 individual academic writing of the participants between the experimental and control groups after conducting the training session by using pre-tests and post-tests and (2) to analyze in depth after the training the differences in participants' self-reflections on the developmental process of how they self-regulated their writing skills during the treatment by using a self-regulated learning questionnaire (i.e., pre- and post-questionnaires) and face-to-face focus-group interviews.

For the purpose of the study, the following RQs are addressed:

1. How does technology-enhanced self-regulation training influence EFL learners' individual writing performance?

a. How does technology-enhanced self-regulation training influence learners' overall writing scores compared to the conventional writing classroom?

b. How does technology-enhanced self-regulation training influence learners' writing performance in terms of five sub-scores of writing performance (e.g., content, organization, vocabulary, language use, and mechanics) compared to the conventional writing classroom?

c. How does technology-enhanced self-regulation training influence learners' writing performance in terms of lexical richness (e.g., lexical density, lexical sophistication, and lexical diversity) compared to the conventional writing classroom?

2. How does technology-enhanced self-regulation training help EFL learners change their perceptions of the improvement of self-regulation capacities in writing skills?

a. How does technology-enhanced self-regulation training help EFL learners change their self-regulated strategy use in writing skills?

b. How does technology-enhanced self-regulation training help EFL learners change their perceptions of the improvement in learners' study behaviors in the CALL environment?

c. How does technology-enhanced self-regulation training help EFL learners change their perceptions of the improvement in the role of collaborative learning in the CALL environment?

Although the vocabulary component of the students' essays has been analyzed in the five sub-components of writing performance (sub-research question 1.b), lexical richness is also studied (sub-research question 1.c) in order to provide in-depth exploration of students' lexical use in many dimensions (e.g., lexical diversity, density and sophistication) in addition to the general marking of teachers.

2.9. Chapter Summary

This chapter has reviewed the literature related to self-regulation training in the general language education field and in writing skills. Self-regulation, as one of the important required skills for life-long learning, includes three main sub-processes, namely, self-

observation, self-judgment, and self-reaction. These sub-processes were also explored in three phases inspired by the self-regulated learning model of Zimmerman (1998), including forethought, performance, and self-reflection. However, self-regulation skills should be taught and gradually constructed based on a move from other-regulation to self-regulation with the support of technology. Therefore, the training session of the current study inspired by the self-regulated learning model of Zimmerman (1998) and the socio-cultural framework for mobile technology-mediated language learning (Ma, 2017) includes three key forms of learner support, namely, affective support, learning support, and collaborative learning support.

The above literature review has indicated (1) the role of technology support in facilitating the self-regulation process and (2) the positive impact of self-regulation training on language learning. Despite the continuous development of technology use for language learning, most EFL learners still struggle with the self-regulated learning strategy use outside the language classroom, mainly due to low levels of self-regulation capacities and motivation. Therefore, self-regulation should be taught and practiced along with students' real-life experiences. Many of the discussed studies explored the positive influence of self-regulation training in different subject disciplines and in the fields of language teaching. However, most of the existing literature has focused on EFL/ESL receptive skills (e.g., reading and listening) and language knowledge (e.g., vocabulary). The effects of technology-enhanced self-regulation training on the competence development of EFL students' productive skills, especially academic writing skills, remains underexplored. Perceiving this research gap in self-regulation training, the present research investigates the effectiveness of self-regulation training supported with technology in developing EFL learners' academic writing performance and their writing self-regulatory capacities in the blended learning environment.

Chapter 3: The Pilot Study

This chapter focuses on the pilot study, the purpose of which was to pilot the research instruments to be employed in the main study. Chapter 4 consists of four sections: (1) context and purposes of the pilot study; (2) the methods of the pilot study; (3) the results of the pilot study; and (4) what can be improved in the main study.

3.1. Context and Purposes of the Pilot Study

The pilot study explored how self-regulated writing training with technology affects L2 individual writing performance and self-regulated writing capacities. Specifically, the study aimed (1) to identify whether there were any differences in individual writing performance between students' essay-writing pre-tests and post-tests and (2) to analyze the students' reflections on the developmental process of how they self-regulated their own writing during the training course. Another important objective of the pilot study was to pilot all research instruments for the main study.

In the second semester of the 2018-2019 academic year, we conducted a pilot study to in preparation for the main study. We implemented a technology-enhanced self-regulation training in one Academic Essay-Writing Course across an eight-week training term. The self-regulated writing training took place in a blended learning setting (i.e., face-to-face and online) and emphasized on three main sessions: (a) general knowledge training, (b) writing skill training, and (c) community-building development.

While the general knowledge training aimed to increase learners' willingness to involve in technology-enhanced self-regulated writing through positive perceptions of the value of and mental preparation for this learning approach, the writing skill training emphasized pedagogical, strategic, and technical training in each step of the writing process. After each face-to-face meeting, collaborative debriefings were implemented through extended writing activities, discussions of training difficulties, and experience sharing. Several online extended writing activities were prepared to help learners practice the above relevant self-regulated writing strategies and recommended technological learning applications or resources.

The pilot study used a quasi-experimental design to evaluate the impact of technology-enhanced self-regulation training on L2 individual writing improvement during eight weeks. In this regard, the study seeks to: (1) explore the differences in the L2 individual writing of the students between the pre-tests and post-tests and (2) comprehend in depth the differences in the students' reflections on the developmental process of how they self-regulated their own writing after the training.

For the purpose of the study, the following RQs are addressed:

1. How does learner training in self-regulated writing supported with technology influence EFL learners' individual writing performance?

2. How does learner training in self-regulated writing supported with technology help EFL learners change their perceptions of the improvement of self-regulation capacities in writing skills?

3.2. The Method of the Pilot Study

The pilot and main studies were conducted in a blended learning environment and focused on three main training sessions (i.e., general knowledge training, writing skill training, and community-building development). There were five main differences in the number of participants, study design, data collection instruments, duration, and training methods between the pilot and the main studies. The differences are illustrated in the following table (Table 1).

Table 1

The Differences in the Method Between the Pilot Study and the Main Study

Differences	The pilot study	The main study
Numbers of participants	10	34 in the experimental group 44 in the control group
Study design	Within-group design	Between-group design
Data collection instruments	Pre-test (week 5) and post-test (week 14)	Pre-test (week 1) and post-test (week 15) Self-regulated learning questionnaire (Pre-questionnaire and post-questionnaire)
	Focus-group interview (10 students)	Focus-group interviews (5 students/ group)
Duration	9 weeks	15 weeks
Training methods	Blended learning - Face-to-face training (outside the writing classroom at the coffee shop or library) - Online training (Schoology platform)	Blended learning - Face-to-face training (integrated into the writing course) - Online training (Schoology platform)

Ten sophomore Vietnamese students from a state university in Vietnam took part in a nine-week training course out of their regular writing classroom, compared to 78 participants and 15 weeks in the main study, respectively. They were English majors from the Department of English, and their English proficiency levels were deemed to be intermediate based on a university-administered placement exam.

In the pilot study, the face-to-face meeting and training lasted around one hour and was carried out once per week. Unlike the main study, all the training sessions took place outside the formal writing classrooms (e.g., in private rooms, in coffee shops, or at the library) and did not relate to the writing lessons in the classroom.

The pilot study, like the main study, collected both qualitative and quantitative data to examine the effects of the self-regulation training model on the EFL students' individual writing performance (RQ1) and the developmental process of their self-regulated writing capacities during the steps of academic writing skill practice (RQ2). In contrast to the main study, the quantitative methods included only essay-writing pre-tests and post-tests, while the qualitative approach employed was face-to-face focus group interviews. The self-regulated learning questionnaire (i.e., pre-questionnaire and post-questionnaire) was not used to evaluate the students' perceptual changes toward the use of self-regulated learning strategy as in the main study.

To evaluate the students' academic writing performance (RQ1), two timed 250-word essays, as pre-tests and post-tests, were administered in weeks 5 and 14 of the semester, respectively. Two writing tests were created in parallel regarding the topic, writing genre, and allotted time. The time allotted for each test was 60 minutes. The topic of the two tests (i.e., media)

was chosen based on its connection to the participants' preferable themes. The two tests were also verified by two English department lecturers and were confirmed to be comparable in terms of difficulty level. As in the main study, the students' academic writing skills were assessed in the same five sub-scores of writing performance, such as content, organization, vocabulary, grammar, and mechanics (Shehadeh, 2011).

The researcher carried out a face-to-face focus-group interview with the participants, similar to the main study, to explore their perspectives and attitudes concerning their self-regulation capacities in academic writing learning with technology assistance (RQ2). Following the training, the students were asked to share their reflections in a group (i.e., 10 participants), lasting between 50 and 60 minutes, on how they perceive the development of their self-regulatory strategies or how they self-regulated their writing during both the training activities and the steps of writing procedure. The researcher clarified the information in each question to examine the accuracy of the participant's responses. Following the face-to-face group interview, follow-up questions would be posted on Facebook if additional clarification or elaboration was required. The interviews were conducted in the participants' native language, Vietnamese, and audio recorded. Following coding, the researcher translated selected quotes from Vietnamese to English, which were then evaluated and reviewed by the other two EFL teachers. The involved EFL teachers possess a high level of proficiency in both English and Vietnamese.

Regarding the quantitative analysis, paired sample t-tests were run to examine whether there were any significant gains in the participants' academic writing performance from pre-tests to post-tests. Turning to the qualitative analysis, thematic analysis (Braun & Clarke, 2006) was used to analyze the qualitative data to find the most prominent themes in terms of the EFL

learners' perceptions of the effectiveness of the technology-enhanced self-regulation training course on their academic writing performance. Subsequently, the interrelationships among the core themes were identified and categorized based on their content.

3.3. The Results of the Pilot Study

The paired sample t-test was performed to identify whether the participants had improved their individual writing performance regarding overall scores, the five sub-scores of writing performance (e.g., content, organization, vocabulary, grammar, and mechanics), and three dimensions of lexical richness (e.g., lexical density, sophistication, and diversity) between the pre-tests and post-tests. The results of the paired sample t-test demonstrated that the participants showed statistically significant changes in the components of overall scores, organization, grammar, vocabulary, and lexical sophistication but did not show any statistical improvement in the components of content, mechanics, lexical density, and lexical diversity. The results revealed that the self-regulated writing training supported with technology improved students' writing competence regarding overall scores and the quality of organization, vocabulary, and lexical sophistication.

The training did not successfully improve the participants' sub-components of content, lexical density, and lexical diversity in writing skills. Since the training of the pilot study was a stand-alone mini course that did not belong to or integrate with the content of the compulsory writing classroom, it was understandable that the participants' learning involvement and commitment could fluctuate due to the heavy learning workloads at the university. Given that the training was conducted in connection with the in-class writing lessons, the participants possibly increased their learning engagement and long-term

commitment to the training. This could contribute to developing their writing competence in other sub-components of writing skills as well as the increased effectiveness of the training.

As revealed by the individual reflections in group, the participants pointed to the short time duration of the training as one of the challenges, which restricted their practice opportunities.

> The training was only eight weeks, and we only met once in one hour. I think it is quite short, and it ends so quickly. I have not fully explored the online training platform and suggested online learning tools. Although I found many exciting ideas that can be used for my future essays in the other groups' outlines or model essays, I lack time to explore and take advantage of them. (L10, group reflection—Pilot study)

In addition, some themes were generated that addressed the students' perceptions of the impact of the training course on their self-regulatory capacities by analyzing the transcribed reflection through thematic analysis. Overall, the qualitative results indicated that the participants had a positive study experience and thought that the training course was quite helpful in initially changing their study behaviors and constructing their collaborative learning strategies in the CALL environment. The qualitative findings gained from the focus-group interview showed that the training program developed the participants' self-regulated writing skills by promoting an understanding of goal setting and strategic planning before the performance. They also positively perceived the effectiveness of collaborative learning activities (e.g., group work and group discussion) and the initial activation of students' writing independence and technology autonomy. Although the participants were not confident enough to tackle the CALL activities and self-regulate their writing beyond the

classroom, they perceived that their self-regulated learning skills grew over time, and they were highly involved in writing tasks in the CALL environment.

In summary, the findings of the pilot study highlighted the mediating role of self-regulated writing training in technology-enhanced language learning so that it could lead to improvement in students' writing outcomes and the writing self-regulation developmental process. In addition, the pilot study contributed to evaluating the effectiveness of the training model and the research instruments of the main study. In addition, the pilot study contributed to confirm the effectiveness of the training model, the research instruments, as well as the validity and reliability of data collection and analysis of the main study. Regarding research questions, the sub-RQs for each research question were added to further clarify the purpose of the RQs in detail.

However, because of the time constraint and the limited number of participants within one group, the results of the pilot study may be difficult to generalize to other contexts. The main study should extend the training course duration, increase the sample size, and explore the effectiveness of training based on a between-subjects design rather than a within-subjects design. In addition, in terms of research instruments, due to the large number of interviewees in the face-to-face focus-group interview, the students' sharing could be limited in quality and easily be dominated by some of the outspoken participants. Therefore, the main study should reduce the number of participants from 10 to 5 students in each focus-group interview to collect detailed, high-quality responses.

3.4. What Can Be Improved in the Main Study?

Following the findings of the pilot study, four main modifications were suggested to the training program for the main study based on the students' sharing and opinions. These modifications affect only the activity design and training duration and do not affect the main structure of the research framework.

Firstly, the theoretical knowledge in the general knowledge training should be delivered through interactive discussions, student sharing, and/or creative learning activities instead of the formal training and handouts used in the pilot study. Secondly, the vocabulary self-expansion activities should be designed more creatively and interestingly to enhance self-regulation skills and increase learners' motivation and engagement. The participants revealed that they preferred to select appropriate online learning resources for academic vocabulary self-study on their own and then creatively use the required number of new academic words in their essays rather than passively reporting new vocabulary in their vocabulary record, as in the pilot study.

In addition, the training period should be extended so that participants can further practice and review what they have learned in the training program. Moreover, the training should be carried out in connection with the official curriculum of the university and with the main content of the writing lessons. Integrating the training with the writing course possibly better encourages the participants' involvement and engagement than if carried out as a stand-alone mini course outside the writing classroom. Finally, the self-regulated learning questionnaire should be added to the main study as quantitative data to analyze in depth how the EFL learners developed their writing self-regulation capacities after participating in the training course along with the qualitative data collected from focus-group interviews.

3.5. Chapter Summary

The technology-enhanced self-regulated writing training presented in the pilot study has potential benefits in improving the students' overall essay scores and the quality of organization, grammar, vocabulary, and lexical sophistication. Although the participants showed a slight improvement in essay quality regarding content, lexical diversity, and density, the improvement from pre-tests to post-tests were not statistically significant. In addition, the training helped the students to initially change their study behaviors (i.e., increasing their understanding of goal setting and strategy planning and increasing their writing independence and technology autonomy) as well as helped to construct the students' collaborative learning strategies through practical group work and discussion.

According to the results of the pilot study, five main modifications should be made in the main study, including more creative training strategies for delivering general knowledge training, an improved design of the vocabulary self-expansion activities, an extension of the training duration, a connection between the training and the in-class courses, and the use of the self-regulated learning questionnaires as quantitative data instruments. The quantitative and qualitative data results of the main study will be presented in the following chapter.

Chapter 4: Methodology

The literature review chapter described, summarized, examined, and clarified the research on self-regulation in language learning, which led to the two main RQs of the study. This chapter describes the methods of the research, providing detailed information on how the study was carried out, such as the site of the study, the participants, the data collection instruments, and how the data were collected and analyzed.

4.1. Site of the Study

The study was undertaken at the Hue University of Foreign Languages and International Studies in Hue city, Vietnam. The university aims to provide undergraduate students with an intensive English language program for students majoring in English during their first three academic years. The curriculum of this university consisted of four introductory language skill courses: speaking, listening, reading, and writing skills. These courses were taught by Vietnamese teachers and lasted 50 minutes per session. The typical class size was between 30 and 45 students. Each 15-week semester, around 900 students aged 18 to 23 years old.

The language program's goal is to equip university students to utilize and practice fundamental English language skills, with a focus on developing the English skills required for their future major and/or career (Tran & Ton, 1996). The purpose of the writing skills, among the four language skills, as illustrated in the university's curriculum is to provide students with opportunities for language rehearsal, learning progress reflections, and language activation (Tran & Ton, 1996). The integration of the four language skills is

currently used in most English classes, with each skill taught using the presentation, practice, and production (PPP) stages model under the CLT approach.

4.2. Participants

The study was conducted in conjunction with two English academic writing courses over 15 weeks in 2020. The training program was delivered by one of the English lecturers from Hue University of Foreign Languages and International Studies, who has 15 years of teaching experience in the English department. The participants were 78 junior Vietnamese students from a state university in Vietnam, none of whom had participated in the pilot study. The participants of the experimental or control groups were selected based on the results of their essay-writing pre-tests before the treatment. The researcher administrated the pre-tests to 10 groups of students who registered the academic writing course in the second semester of academic year 2019-2020. Two groups—namely, the experimental and control groups—were chosen based on their similar writing proficiency. The two writing groups (i.e., the experimental and control groups) were assigned the same number of writing tasks, used the standardized grading system, and met for roughly two hours each week. The experimental group (n = 34) was allocated to complete their writing course under the provision of writing self-regulation training supported by technology. The control group (n = 44) was tasked to finish their writing course in the traditional writing class. Both groups took an individual essay-writing pre-test in week 1, completed several essay-writing tasks assigned by the teachers inside and outside the class during the course, and took an individual essay-writing post-test in week 15.

The participants were taught the strategies to produce grammatically correct sentences; complete comprehensive paragraphs with clear topic sentences; and generate well-organized academic essays with clear thesis statements, supporting ideas, and conclusion paragraphs. They also learned the ways to produce peer feedback and respond to it for revising and editing their essays. An independent t-test was conducted on students' pre-test writing to ensure that the two groups had comparable writing proficiencies (Table 2).

Table 2

Descriptive Statistics, Investigating Differences Between Groups in Pre-Test Writing

Measures	**Experimental Group**		**Control Group**			
	M	**SD**	**M**	**SD**	***t***	***p***
Overall scores	7.49	1.03	7.19	0.79	1.44	0.15
Content	7.73	0.59	7.95	0.52	1.75	0.08
Organization	8.09	0.87	8.14	0.73	-0.27	0.79
Vocabulary	6.71	0.72	6.89	0.54	-1.27	0.20
Grammar	6.50	0.96	6.52	0.76	-0.12	0.91
Mechanics	9.35	0.65	9.16	0.53	1.46	0.15
Lexical density	0.51	0.04	0.52	0.07	0.17	0.87
Lexical sophistication	0.47	0.13	0.41	0.18	1.66	0.10
Lexical diversity	60.70	18.30	62.67	17.87	-0.48	0.63

Regarding students' technology usage at the university, the majority of students do not commonly employ technological resources and applications for their language learning. A small number of language teachers, primarily younger educators, incorporate technological applications in their classrooms, focusing mainly on receptive language skills such as listening and reading. Moreover, most students at the university have not received any training related to using technology resources for language learning, particularly for self-study outside the classroom.

4.3. The Training Program

4.3.1. The Description of the Training in Self-Regulated Writing

Only the experimental group received self-regulated writing training session in a blended learning environment. The face-to-face self-regulation training session was carried out concurrently with the writing lesson, whereas the online training session was conducted via an online learning management system (Schoology). During the briefing session, students were given a training schedule so that they could completely comprehend the training objectives, learning outcomes, and the weekly learning activities or tasks.

The design of the self-regulated writing training program was aligned with the conceptual framework presented in Figure 3 in the literature review chapter. The training program was constructed based on Zimmerman's (2000) self-regulated learning three-phase cyclic model, namely, the forethought, performance, and self-reflection phases (see Figure 1). In addition, it aimed to target the three features of learner preparation for self-regulated language learning in the CALL context—(a) affective support, (b) learning support, and (d) collaborative learning support. See Figure 3 for the technology-enhanced self-regulation training model for writing skills that has guided the training program of this study.

As the literature review showed, affective support plays the role of the motivating agent in self-regulated learning (Krashen, 1988; Lantz-Andersson et al., 2013). Therefore, regarding the component of affective support (a), the general knowledge training session was where learners were prepared with the prerequisite attitude toward the language learning theories and strategies, the value of self-regulated learning, and the initial motivation in the CALL

context before practicing the CALL tasks. The literature review also showed that learning support is the mediating agent in the developmental process of self-regulated learning (Barrette, 2001; O'Bryan, 2008; Ranalli, 2013; Romeo & Hubbard, 2010; Smith & Craig, 2013; Zenotz, 2012). Therefore, in the learning support component (b), the writing skill training session was where learners were prepared with the relevant pedagogical, strategic, and technical training related to writing skill acquisition to tackle CALL tasks and control their writing practice process. The writing skill training included two steps: (1) pedagogical and strategic training and (2) technical and strategic training. The two training steps were delivered through small training junctures according to each stage of the essay-writing process. Following many researchers (Foster & Ohta, 2005; Hsieh, 2017; Koschmann, 2002; Ohta, 2001; Wenger, 2010), collaborative learning support also plays the role of the mediating agent in the developmental process of self-regulated learning. Therefore, in the collaborative learning support component (c), the community-building development session, was designed to provide learners with extended learning activities, allow them to self-evaluate their learning experience and/or progress as well as difficulties encountered, and engage them in the technology-enhanced collaborative learning community. The description of the training is illustrated in Table 3.

4.3.2 Concrete Training Activities in the Self-Regulated Writing Course

Forethought—General Knowledge Training. The first self-regulated writing training session included general pedagogical training through a discussion about the language learning approaches, effective learning strategies, the characteristics of a language learner, rationales and strategies related to self-regulated writing, and the interconnection between technologies and writing skills. By receiving some of the same pedagogical

knowledge the teacher had related to language learning approaches and principles, learners were expected to gradually be more responsible for their own learning (Hubbard, 2004). The session was adapted from the training of Lai et al. (2016b) and aims to boost learners' willingness to involve in a self-regulated learning environment with technology through positive perceptions of the value of and mental preparation for this learning strategy.

In addition, the purpose of the training activities was to support learners in first experiencing technological learning tools to self-regulate their writing. Before students practiced their self-regulation skills in the CALL environment, they could become familiar with and try out social media and online learning management systems such as Facebook, Schoology, and Google Docs for their writing lessons. Furthermore, the students were encouraged to disclose what online learning tools or materials they were utilizing for writing and to examine numerous technological applications prior to the self-regulated writing training session.

Performance—Writing Skill Training (Pedagogical & Strategic Training/ Technical & Strategic Training). The second self-regulated writing training session focused on relevant strategies or processes related to writing skill acquisition. In the study, the writing class followed a process-based approach, which required students to go through various steps of revising, editing, and writing multiple drafts for each writing task. The writing process consisted of four stages: (1) pre-writing (e.g., vocabulary build-up & grammar revision, planning & topic brainstorming), (2) drafting (e.g., first draft, peer & instructor feedback), (3) revising and editing (e.g., revised draft & second draft, editing), and (4) publishing (e.g., submission). In all the revising and editing steps, the functions of "Track Changes" and "Comments" in Microsoft Word or Google Docs were used to record all changes.

Aside from the publishing stage, each writing stage (e.g., pre-writing, drafting, and revising/ editing) includes two steps of self-regulated writing training derived from the training activities in Lai et al. (2016b): (1) pedagogical and strategic training to support learners in preparing for their goal setting and strategy planning and (2) technical and strategic training to assist learners in matching appropriate technological learning devices with their relevant writing purposes in order to involve more effectively in the CALL context. Compared to the online and self-study training activities in Lai et al. (2016b), the training in this study was presented through face-to-face discussion and in-class training activities, followed by sample videos, soft files (i.e., PDF files), and extended learning activities uploaded on Schoology for further practice and revision outside the classroom.

Pedagogical and Strategic Training. Learners were prepared to discuss theoretical concepts and related approaches underlying many aspects of writing skill acquisition through pedagogical training. In the topic brainstorming session, for example, learners were recommended to disclose their current difficulties, which was followed by the suggested tactics and steps on planning before writing, such as outlining ideas and brainstorming functional structures, and on-topic language. The training was delivered via an interactive dialogue between students and teachers.

Technical and Strategic Training. Students were given a variety of relevant technological learning devices and resources to help them implement their aforementioned strategies or steps in the pedagogical and strategic training session and then practice self-regulating their writing in the future. For example, numerous practical technical applications and rich learning materials (e.g., mind mapping tools, genre model banks, and interactive text organizers) were introduced and demonstrated in order to assist students in constructing the

outline and brainstorming functional structures and languages needed. The teacher presented the technical guidance in the classroom for each technological application or learning resource and uploaded them online for additional exploration outside of the classroom. Furthermore, some useful hints, such as general exploitation tactics, were supplied to help trainees comprehend how to apply these online applications more effectively or maximize their potential in technology-enhanced language learning beyond the classroom. Some suggested online learning tools or applications according to writing stages are summarized in the following table (Table 3).

Table 3

Summary of Online Learning Tools or Applications

Writing Stages	Online Learning Tools/ Applications
Brainstorming	*Popplet (Mind Map)*
	Padlet / Doodle / Jamboard (Idea Pool)
Language Tool	*Quizlet / Kahoot / Duolingo*
	YouTube / Learning Websites / Online Model Essays
Feedback	*Dropbox / Track Changes in Doc*
Collaborative Writing	*Track Changes in Doc*
	Zoho Docs / Google Docs
Editing	*Grammarly*
	Corpus-Based Learning
	Online Dictionary
Publication	*Joomag / Canva*
	Facebook—Create Doc

At Hue University of Foreign Languages and International Studies, teachers have the autonomy to select the technological resources and applications related to language learning in their classrooms. As a result, the teacher and the researcher engaged in discussions to determine which online learning tools or applications should be utilized in the teacher's writing classes during the semester prior to the training session. If the teacher was unfamiliar with any technology tools or applications, additional training or support would be provided. Furthermore, student participants were encouraged to share their preferred technological learning tools and applications, and they were motivated to use them for practicing writing skills outside the classroom according to their individual preferences.

When the students were practicing self-regulated writing activities, the training activities were carried out based on a progressive, cyclical approach with small intervals of training each time. In each training activity, learners first experienced self-regulated writing activities with the assistance of technology (i.e., pedagogical & strategic training), followed by their attention to the strategic use of the activities and technical tutorials on the technological applications for self-regulated writing purposes (i.e., technical & strategic training). In addition, pedagogical, strategic, and technical training activities were repeatedly delivered through the different stages of the writing process (e.g., pre-writing, drafting, and editing).

Self-Reflection—Community-Building Development (Extended Learning Activities, Training Difficulties, and Experience Sharing). After the learners had practiced the self-regulated writing activities, collaborative debriefings were implemented through extended learning activities, discussions of training difficulties encountered, and experience sharing. Learners were asked to complete several writing activities that involved using the aforementioned technological learning applications and resources—from group work, such as

brainstorming, editing, and giving feedback to individual work, such as individual writing and revising. For example, in extended learning assignments outside the classroom, learners were given a suggested list of writing topics and requested to use the proper technology tools to self-regulate their writing and complete the essay-writing task from the pre-writing through publishing stages. The additional writing tasks provided students with more opportunities to practice their self-regulation abilities, become familiar with the use of technological devices and/or applications as learning aids, and ultimately become more competent in technology-enhanced language learning in classroom and out of the classroom.

In addition, the teacher held an online discussion forum during the training and a debriefing session in the classroom after each session for student sharing and difficulty troubleshooting. The teacher-student dialogue allowed the participants to self-reflect on their experiences with technology-enhanced language learning, including recognizing challenges encountered and assessing the training effects. In other words, the instructor facilitated a collaborative learning discussion in which the instructor shared their own experiences with students while allowing the participants to share experiences from the perspectives of learners. The summary of the concrete training activities is illustrated in the following table (Table 4).

Table 4

Concrete Training Activities

Phases **Types of support**	**Training**	**Concrete training activities**
Forethought – Affective Support	General Knowledge Training	✓ Theory of language learning methods ✓ Useful language learning strategies ✓ Self-regulation language learning ✓ Role of technology in language learning

Performance – Learning Support	Writing Skill Training	***(A) Pedagogical & Strategic training*** ✓ Theory of L2 writing acquisition ✓ Goal & Strategy planning ***(B) Technical & Strategic training*** ✓ Technological tools for each writing stage ✓ Technical tutorials for each technological tool ✓ Useful strategies/ tips ***(C) Follow-up activities*** ✓ Learning activities for further exploration ✓ Experience sharing among learners and teacher
Self-reflection – Collaborative Learning Support	Community Building Development	✓ Extended learning activities ✓ Training experience sharing ✓ Tackling the difficulties

4.4. Instructional Materials for the Experimental and Control Groups

4.4.1. Similarities Between the Two Groups

The writing course lasted 15 weeks. The participants in both groups practiced their essay writing on topics related to technology from weeks 2 to 4 (Cycle I), the environment from weeks 5 to 7 (Cycle II), and education from weeks 9 to 11 (Cycle III). They then reviewed what they had learned from weeks 12 to 14.

Both groups were trained on content-related issues of the academic writing lessons. The participants were taught with the entire writing process as well as the different aspects of academic writing, that is, content, organization, vocabulary, grammar, and mechanics. In

addition, the peer-feedback procedure and the criteria for providing feedback to their peers were delivered to the participants in both groups. In terms of the writing process, the lessons of both groups followed the same process, which included (1) pre-writing, (2) drafting, (3) revising and editing, and (4) publishing.

4.4.2. Differences Between the Two Groups

Experimental Group. In addition to the content-related issues of the academic writing lessons, the students in the experimental group were introduced to the technical-related issues for self-regulating their writing. The participants were introduced to the sample videos in week 1, with which the instructor illustrated how to use Schoology and Google Docs as online learning platforms during the course, such as how to complete online vocabulary activities, give and receive online peer feedback, revise and edit essays online, and submit online writing assignments outside the classroom. Moreover, the participants' questions about technical difficulties using online platforms were answered in the classroom during the course.

In the first 20 minutes of each 100-minute writing session, the participants in the experimental group, working in groups, were delivered the topics for essay writing through vocabulary build-up and grammar revision via some suggested game-based learning platforms, such as Kahoot! and through topic-brainstorming activities via some suggested technological learning tools, such as Padlet and Popplet.

After the above pre-writing activities, the training in self-regulated writing supported with technology was provided to the participants in the experimental group (see details in

Appendix I). Unlike the control group, general knowledge training was presented to the participants in the experimental group 10 minutes before the writing lesson. The writing skill training was delivered 20 minutes before each step of the writing process, such as brainstorming and vocabulary activities, producing a first draft, receiving peer feedback, and revising and editing (Table 4). In the general knowledge training session, the instructor led the pedagogical conversation on the theoretical principles of language learning approaches, strategies, and the power of technologies in writing. During the writing skill training, the participants were instructed to explore the rationales for L2 writing acquisition and establish their own goals and relevant strategies in their writing practice (i.e., pedagogical and strategic training), followed by technical and strategic training. Therein, the participants were introduced to several technological tools and supported with relevant strategies, tutorials, and tips. There was no such training in the control group.

After the training, the participants individually spent 40 minutes writing the in-class first draft and shared their essay with their peers and the teacher on Google Docs for peer and instructor feedback outside the classroom. Peer feedback was carried out in groups of five compared to in-class pair work in the control group. Each participant in the experimental group gave feedback to their classmates in their groups. The peers and instructor gave feedback on the criteria of content, organization, language complexity, and accuracy while solely identifying grammatical and lexical mistakes and/or errors rather than giving error correction to foster self-correction.

Moreover, after the self-regulated writing training for each step of writing, the students in the experimental group were required to complete several extended activities in class (10 minutes) and beyond the classroom to further explore these online learning tools and

resources with the teacher's assistance, if needed. The teacher and researcher also answered the learners' questions or helped with difficulties encountered in class. There were no such extended learning tasks in the control group.

After the participants received peer and instructor feedback, they individually revised their first draft to make the second draft and self-edited their second draft at home based on some suggested online lexical applications, such as Grammarly, online dictionaries, and corpus-based learning platforms. In the revising and editing steps, the experimental group was encouraged to use online lexical tools to self-edit their essays, whereas the control group used solely traditional strategies or techniques to self-revise their essays, including textbooks and dictionaries.

Finally, the students submitted their final essay on the learning platform Schoology. Beyond the classroom, the participants in the experimental group were given a list of suggested gamed-based learning platforms and websites to self-extend their vocabulary and review their grammar, such as Quizlet and Duolingo. Each participant was delivered a sheet of "Guidelines for Individual Writing Activity" (Appendix F) and a sheet of "Vocabulary Learning" (Appendix J) to fully understand the writing procedure and vocabulary learning procedure, respectively, at the beginning of the training. The instructional materials of the experimental group are illustrated in Table 4 below.

Control Group. In the control group, the participants went through the same writing process described above but individually reviewed their grammar and built up their vocabulary through topic-based vocabulary and grammar exercises for each lesson in the

textbook (30 minutes) compared to the game-based learning platforms used in the experimental group.

After the pre-writing activities, they performed their in-class writing assignments on papers (40 minutes). They were required to edit their peers' essays and comment on each other's essays in class (30 minutes) without receiving self-regulated writing training supported by technology. Unlike the experimental group, the participants in the control group worked in pairs, gave peer feedback, and received instructor feedback in class.

At home, the participants in the control group were asked to review new words through paper-based vocabulary exercises designed by the instructor or their favorite online vocabulary exercises rather than the suggested game-based learning platforms and vocabulary learning websites and applications in the experimental group. Moreover, the control group completed the individual writing assignment outside of the classroom but without training to promote self-regulated writing capacities supported with technology, as in the experimental group. Finally, they submitted their paper-based essays to the instructor in the following week's writing class.

The following table illustrates the similarities and differences of the groups' instructional materials for the writing lessons (Table 5).

Table 5

Instructional Materials for Both Groups

Stages of writing	Experimental Group (With SRT with Technology)	Control Group (Without SRT with Technology)

Stage I: Pre-writing (In-class)	• General knowledge training (10 minutes) • Vocabulary build-up / Grammar revision (Game-based / 10 minutes) • Planning / Topic brainstorming (Online learning tools / 10 minutes)	• Lesson revision (10 minutes) • Vocabulary build-up / Grammar revision (Textbook-based / 10 minutes) • Planning / Topic brainstorming (Paper-based / 10 minutes)
Stage II: Drafting (In-class & outside-class)	• Pedagogical & strategic training / Technical & strategic training (In-class/ 20 minutes) • First draft (Online / 40 minutes) • Extended learning activities / Training difficult & experience sharing (In-class/ 10 minutes) • Vocabulary exercise (Game-based / Outside-class) • Peer- & instructor feedback (Group work / Online / Outside-class)	*No self-regulated writing training supported by technology* • First draft (Paper-based / 40 minutes) • Peer & instructor feedback (Pair-work / In-class / 30 minutes) • Vocabulary exercise (Paper-based / Outside-class)
Stage III: Revising & Editing (Outside-class)	• Revised draft & second draft (Online) • Editing (Online lexical applications)	• Revised draft & second draft (Paper-based) • Editing (Dictionaries / Textbooks)
Stage IV: Submission (Outside-class)	• Submission • Extended learning activities / Training difficult & experience sharing	• Submission

Note. *SRT: Self-regulation training

4.5. Data Collection Instruments

In their English academic writing course, two groups of students participated in this exploratory and quasi-experimental research. According to Cohen (2000), a quasi-experimental design should be employed when the randomization criteria cannot be met. As a result, the researcher divided the participants into two groups: the experimental group, in which the participants received self-regulation training supported by technology in the writing course, and the control group, in which the participants practiced academic writing skills in the traditional classroom, as described above.

This study examines the effectiveness of technology-enhanced self-regulation training on L2 academic writing development over 15 weeks. In this respect, the study aimed to answer two main RQs: (1) How does learner training in self-regulated writing supported with technology improve EFL learners' individual writing performance? and (2) How does learner training in self-regulated writing supported with technology help EFL learners change their perceptions of their improvement of self-regulation capacities in writing skills?

As mentioned in the literature review chapter, most previous studies have concentrated on examining the training effects mainly through the use of quantitative data instruments (e.g., language proficiency tests, writing tests, and surveys). Given the importance of qualitative data in further elaborating the quantitative data and capturing the picture of students' writing progress and self-regulated development, both qualitative and quantitative data were collected in the present study. While the essay-writing pre-tests and post-tests aimed to answer the first RQ, the self-regulated learning pre- and post-questionnaires and face-to-face focus-group interviews were used to answer the second RQ. The data collection instruments are presented in the following table (Table 6).

Table 6

Data Collection Instruments

Data Collection Instruments	When	Who
1. Timed Essay-writing Test		Experimental & Control Groups
• Pre-test	Week 1	
• Post-test	Week 15	
2. Self-regulated Learning Questionnaire		Experimental Group Only
• Pre-questionnaire	Week 1	
• Post-questionnaire	Week 15	
3. Face-to-face Focus-group Interviews	Middle of the training (Week 8) After the training (Week 15)	Experimental Group Only

4.5.1. Essay-Writing Pre-Tests and Post-Tests

The essay-writing pre-tests and post-tests aimed to examine the impact of the self-regulation training model in improving the students' academic writing performance (RQ1). In the essay-writing tests, each participant was asked to complete an essay about a given topic within 60 minutes. In this study, there were two 250-word essays on social networking sites and the environment for the pre-tests and post-tests, respectively. Two writing tests were designed in parallel regarding the topic, writing genre, and allotted time. The allotted time for pre-tests or post-tests was 60 minutes. The topics of the two tests were selected for relevance to the participants' preferred themes. The two tests were also verified by two lecturers from the English department and were confirmed to be comparable in terms of the level of difficulty.

Each participant individually took a pre-test in week 1 and a post-test in week 15 of the semester. The description of the essay-writing pre-test and post-test is summarized in the following table (Table 7). The details of the pre-test and post-test are summarized in Appendix D.

Table 7

Description of Essay-Writing Pre-Test and Post-Test

Tests	**Time allotted / Word length**	**Topics**
Timed Pre-test (Week 1)	Time allotted: 60 minutes	Social networking sites
Timed Post-test (Week 15)	Word length: 250 words	Environment

Each participant received a score from 1 to 10 for their overall score and a score from 1 to 10 for each sub-component of writing performance in the marking rubric described below. The marking rubric was adopted from Shehadeh (2011), evaluating EFL learners' writing performance in writing essays based on five sub-components: content, organization, vocabulary, grammar, and mechanics. The marking rubric for the essay-writing pre-tests and post-tests is presented in Table 8. A sample of the essay marking sheet is presented in Appendix E.

Table 8

The Marking Rubric for Pre-Tests and Post-Tests

Criteria	**Points**	**Description** (Shehadeh, 2011)
1. Content	10 points	"Knowledge of the subject; development of thesis statement; development of topic; relevance of supporting ideas; quality of main ideas and details." (Shehadeh, 2011, p. 291)
2. Organization	10 points	"Fluency of expression; clarity in the information organization;

		effective sequencing and development of ideas; effective use of transitions." (Shehadeh, 2011, p. 291)
3. Vocabulary	10 points	"Range; accuracy of word/idiom use; mastery of word forms; effectiveness in the transmission of meaning." (Shehadeh, 2011, p. 292)
4. Grammar	10 points	"Use of sentence structures and constructions; accuracy and correctness in agreement, number, tense, word order, articles, pronouns, prepositions, and negation." (Shehadeh, 2011, p. 292)
5. Mechanics	10 points	"Conventions of spelling; punctuation; capitalization; indentation" (Shehadeh, 2011, p. 292)

Note. Adapted from (Shehadeh, 2011, pp. 291-292)

In addition, the pre-tests and post-tests of both groups were collected to analyze lexical richness. The study used Tom Cobb's VocabProfilers to analyze three dimensions of complexity (i.e., lexical richness). The following dimensions were mostly utilized to evaluate the increases in linguistic complexity in students' texts (Lu & Ai, 2015; Lu, 2012).

1. Lexical density is defined as the proportion of the number of lexical words to total number of words in a text.
2. Lexical sophistication refers to "the proportion of relatively unusual or advanced words in the learner's text" (Read, 2000, p. 203).
3. Lexical diversity refers to the range of vocabulary demonstrated by learners in their language use.

4.5.2. Self-Regulated Learning Questionnaire

The questionnaire was used to analyze the learners' perceptions of the impact of the self-

regulation training model in developing self-regulated writing supported with technology in their writing class (RQ2). The self-regulated learning questionnaire was only administrated to the experimental group. The participants in the experimental group completed a pre-questionnaire adapted from Ma (2019) at the beginning of the semester (week 1). An equivalent post-questionnaire was administered at the end of the semester (week 15). There were 51 Likert-scale items ranging from 1 to 6, with 1 being strongly disagree and 6 being strongly agree).

To ensure that all participants understood all items of the questionnaire, the questionnaires were written in the first language (i.e., Vietnamese) of the participants. The questionnaire was first translated into Vietnamese by the researcher and then reviewed by the two EFL teachers who specialize in both Vietnamese and English to avoid possible misunderstandings or problems related to language. The Back-Translation Technique was employed to ensure the reliability and validity of questionnaire items in the two different languages. The Vietnamese version was back translated into English by two experienced translators. Then the original English version and the back-translated Vietnamese version were compared. The translators and the researcher had an intense discussion about the accuracy of the translation and some minor modifications were carried out according to the translators' suggestions. For this study, the internal-consistency coefficient alpha of the self-regulated learning questionnaire was .90 based on the pilot study.

The questionnaire elicited the students' perceptions of using self-regulated language learning strategies in the CALL context in three phases, namely, forethought, performance, and self-reflection. In the forethought phase, the questionnaire measured five main constructs of (a) learning goal and planning (4 items), (b) self-efficacy beliefs for mobile learning (4 items),

(c) self-efficacy beliefs for language learning (3 items), (d) intrinsic motivation (3 items), and (e) extrinsic motivation (3 items). The second phase (performance) elicited the participants' perspectives of the following seven constructs: (a) task strategies (5 items), (b) time management (3 items), (c) environment (3 items), (d) self-rewarding (3 items), (e) maintain interest (3 items), (f) emotion (3 items), and (g) self-observation (3 items). The purpose of the last phase (self-reflection) was to collect information on the following constructs: (a) self-evaluation (4 items), (b) task strategy evaluation (3 items), and (c) future planning (3 items). The questionnaire description is summarized in the table below (Table 9). The details of the self-regulated language learning questionnaire are presented in Appendix G.

Table 9

Description of Self-Regulated Learning Questionnaire

Phases	Main constructs	Numbers of questions	Examples
Forethought	Learning goals & planning	4	*I set up weekly/monthly tasks for my writing learning.*
	Self-efficacy beliefs for mobile learning	4	*I have the necessary skills for mobile learning.*
	Self-efficacy for writing learning	3	*I am confident I have good writing skills to achieve my goals.*
	Intrinsic motivation	3	*I think it is very interesting to learn academic writing.*
	Extrinsic motivation	3	*I practice academic writing because it helps me gain more knowledge and skills related to my subject learning.*
Performance	Task strategies	5	*I know what techniques/strategies I should use to facilitate my writing tasks.*

	Time management	3	*I think I can achieve my writing learning goals within the intended period.*
	Environment	3	*When learning and practicing writing, I look for a good learning environment.*
	Self-rewarding	3	*I promise myself something I want when I complete a specific amount of writing tasks (e.g., going to a movie, getting together with friends, a favorite CD).*
	Maintain interest	3	*In writing learning, I am confident that I can overcome any sense of boredom.*
	Emotion	4	*When I feel stressed about writing learning, I know how to reduce this stress.*
	Self-observation	3	*I check from time to time whether my writing learning is on a good track.*
Self-reflection	Self-evaluation	4	*I will regularly check whether my writing learning goal has been achieved or not.*
	Task strategies evaluating	3	*At the end of my writing learning, I will reflect on whether my learning approaches/strategies are appropriate.*
	Future planning	3	*I will make a better study plan in the future.*

4.5.3. Face-to-Face Focus-Group Interviews

The focus-group interviews were used to analyze the impacts of self-regulation training in improving learners' capacities of self-regulated writing in the CALL context (RQ2). The face-to-face focus-group interviews were carried out in the middle of the semester (week 8) and at the end of the semester (week 15). Only the participants in the experimental group took part in the focus-group interviews. During the interviews, the interviewees were required

to share their opinions on three main aspects: (1) their experience in the practice of self-regulated writing capacities in the language classroom and outside of the classroom, (2) their self-regulation capacities in writing skills, and (3) the assistance of technology in the self-regulated writing process. The detailed questions of the face-to-face focus group interviews are presented in Appendix H.

Twenty participants took part in the focus-group interviews and were divided into four interview groups. For ethical considerations, pseudonyms were given to the interview participants to protect their identity. They were named from L1 to L20. The participants shared their opinions in groups of around five students for between 50 and 60 minutes on how they perceived the development of their self-regulatory strategies and how they self-regulated their practice of writing during the training course and during the writing process with the assistance of technology. After the face-to-face focus-group interviews, follow-up questions were uploaded via Facebook if further clarification or elaboration was needed. The focus-group interviews were carried out in the students' mother tongue, Vietnamese, and audio recorded. The focus-group interviews were translated into English after coding. Selected quotes were translated from Vietnamese to English by the researcher, then checked and confirmed by the other two Vietnamese lecturers teaching English at the Hue University of Foreign Languages and International Studies in Vietnam. Both lecturers possess a high degree of language proficiency in both English and Vietnamese.

4.6. Procedure

The research framework (Figure 3) involved three main phases: forethought, performance, and self-reflection. The pre-tests and post-tests were designed to assess students' performance

differences between the experimental and control groups. The instruments included the essay-writing pre-tests and post-tests, self-regulated learning pre- and post-questionnaires, and face-to-face focus-group interviews. The participants took essay-writing pre-tests and post-tests in weeks 1 and 15, respectively. The pre- and post-questionnaires were delivered and completed in weeks 1 and 15, respectively. The face-to-face focus-group interviews were carried out in the middle of the training (week 8) and after the training (week 15). The students in both groups read the research information sheet (Appendix C) and signed the consent form (Appendix B) to voluntarily participate in the study.

In week 1, the essay-writing pre-tests and course introduction were administered to the participants in both groups. Unlike the control group, some technical issues related to online learning platforms were discussed with the participants of the experimental group only to prepare for the training in self-regulated writing supported with technology. After that, they were asked to complete a self-regulated learning pre-questionnaire (Appendix G).

From weeks 2 to 4, the participants in the experimental and control groups practiced their academic writing skills with the essay topic of technology. The writing lessons of both groups followed the same process, including (1) pre-writing, (2) drafting, (3) revising and editing, and (4) publishing. First, the students in both groups were given the writing topics through vocabulary build-up, grammar revision, planning, and topic brainstorming activities in the pre-writing stage. After that, they wrote their first draft, followed by peer and instructor feedback in the drafting stage. Next, they revised their essay papers and wrote a second draft, followed by further self-editing of the writing for the final submission. Finally, they submitted their writing to the instructor.

While the students in the experimental group took the writing lesson with the self-regulated writing training supported by technology, there was no such training in the control group. Accordingly, there were three main differences in the writing lessons between the experimental and control groups. Firstly, general knowledge training was presented for the students in the experimental group only before the writing lesson, and the writing skill training was delivered before each step of the writing process, such as brainstorming, the vocabulary exercise, the first draft, peer feedback, and revising and editing. The learners in the experimental group could review the self-regulated writing training as well as share their training difficulties encountered and experience through several extended training activities and sharing sessions after the lesson each week. However, the participants in control group just followed the writing lesson based on the four-stage writing process, as mentioned above. They completed their individual essays at home without training in how to promote the self-regulation capacities supported with technology in writing skills, as in the experimental group.

Secondly, most of the writing activities in the experimental group were carried out with the assistance of technology with the aim to support their self-regulated writing, such as game-based vocabulary build-up, grammar revision, online first and second drafts, online peer feedback and instructor feedback, and revising and editing with the support of online learning tools compared to the mostly paper-based and textbook-based writing activities in the control group. Thirdly, while the students in the control group gave peer feedback in pairs and received instructor feedback in class, those in the experimental group performed their online peer and instructor feedback outside class and in groups of five.

The writing cycle from weeks 2 to 4 (i.e., cycle I) was repeated in cycle II from weeks 5 to 7 and in cycle III from weeks 9 to 11 with different essay topics, including the environment and education, respectively. In the experimental group, the training was repeated interactively in the second and third cycles to provide students with opportunities to consolidate all of the training sessions and share their own learning experiences, challenges encountered, or problems during the training course. Such three-cycle training was to ensure a sustainable and prolonged self-regulation training as compared to many other studies that conducted short trainings (e.g., Alparda, 2010; Glaser & Brunstein, 2007; Göy, 2017; Raja et al., 2022).

Post-tests, which had the same difficulty levels and procedures as the pre-tests, were given to both groups in week 15 to evaluate the participants' academic writing skills. The participants in the experimental group were instructed to complete a self-regulated learning post-questionnaire as well as face-to-face focus-group interviews. The post-questionnaire, like the pre-questionnaire, was conducted in week 15. The interviews were carried out in Vietnamese with four groups (5 participants/per group) in the classroom in the middle of the training (week 8) and after the training (week 15). Each group interview lasted between 50 and 60 minutes, and it was audio-recorded and transcribed for further analysis. The research procedure is summarized in the following table (Table 10).

Table 10

Research Procedure

	Experimental Group (With SRT with Technology)	**Control Group (Without SRT with Technology)**
Week 1	• Pre-test • Course introduction	• Pre-test • Course introduction

	• Online platform introduction • Self-regulated learning pre-questionnaire	
Cycle I (Weeks 2–4) Topics of Technology *Stage I:* Pre-writing	• General knowledge training • Vocabulary build-up / Grammar revision • Planning / Topic brainstorming	• Lesson revision • Vocabulary build-up / Grammar revision • Planning / Topic brainstorming
Stage II: Drafting	• Pedagogical & strategic training / Technical & strategic training • First draft • Extended learning activities / Training difficult & experience sharing • Vocabulary exercise • Peer & instructor feedback	• First draft • Peer & instructor feedback • Vocabulary exercise
Stage III: Revising & Editing	• Revised draft & second draft • Editing	• Revised draft & second draft • Editing
Stage IV: Submission	• Submission • Extended learning activities / Training difficult & experience sharing	• Submission
Cycle II—Weeks 5–7 Week 8	Same as the session I—Topics of environment • Face-to-face focus-group interviews	

Cycle III—Weeks 9–11	Same as sessions I & II—Topics of education	
Weeks 12–14	Revision	
Week 15	• Post-test • Face-to-face focus-group interviews • Self-regulated learning post-questionnaire	• Post-test

Note. *SRT: Self-regulation training

4.7. Data Analysis

4.7.1. Data Analysis Methods

The research had two main RQs: (1) How does learner training in self-regulated writing supported with technology improve EFL learners' individual writing performance? and (2) How does learner training in self-regulated writing supported with technology help EFL learners change their perceptions of their improvement of self-regulation capacities in writing skills? The quantitative and qualitative data analysis methods are presented in the Table 11 and discussed below.

Table 11

Description of Data Analysis Methods

Data collection instruments		RQs	Data analysis	Purposes
		QUANTITATIVE DATA		
Pre-tests Post-tests	Overall scores	RQ 1	Independent t-test	To investigate the differences in improving EFL learners' writing performance between the two groups

			by comparing the mean differences in overall scores from pre-tests to post-tests between the two groups.
	Five sub-scores of writing performance	One-way MANOVA	To investigate the differences in improving EFL learners' writing performance regarding five sub-scores between the two groups by comparing the mean differences from pre-tests to post-tests for each sub-score between the two groups.
	Lexical richness	One-way MANOVA	To investigate the differences in improving EFL learners' writing performance regarding lexical richness between the two groups by comparing the mean differences from pre-tests to post-tests for each sub-score between the two groups.
Self-regulated learning questionnaire	RQ 2	Paired sample t-test	To compare the pre-questionnaire and post-questionnaire responses of the participants in the experimental group.
QUALITATIVE DATA			
Face-to-face focus-group interviews	RQ 2	Thematic analysis (Braun & Clarke, 2006)	To examine the learners' perspectives on the effect of the training on their writing performance and self-regulation skills development.

4.7.2. Data Analysis Procedure

Quantitative Data Analysis.

Overall Score and Five Sub-Scores of Writing Performance. After the writing course, the essay-writing pre-tests and post-tests were photocopied and randomly coded to avoid bias. Information on students' names and which essay-writing test (e.g., pre-tests or post-tests) was eliminated to safeguard the marking would be blind. All raters had over 10 years of teaching experience in English language teaching in tertiary education. They were advanced essay-writing instructors and experts in the course Academic Essay Writing. The raters assigned a score of 1 to 10 to each student' pre-test and post-test for total academic writing (i.e., overall scores) and for each sub-component in the above-mentioned writing rubric (i.e., content, organization, vocabulary, grammar, and mechanics). Following the completion of the marking stage by the two raters, the average scores of the total academic writing and sub-components of each participant's pre-test and post-test were and then imported into Statistical Package for Social Sciences (SPSS) Version 24 for data analysis. The inter-rater reliability for the pre-tests and post-tests were 90% and 89%, respectively.

Because continuous scores were given to the participants' performance on academic writing skills (i.e., from 0 to 10) in the two groups, and the data for the writing pre-tests and post-tests were normal, as checked through the Kolmogorov-Smirnov test, we used parametric tests (independent sample t-test and one-way MANOVA) to analyze the results of the participants' writing outcomes in the pre-tests and post-tests in the experimental and control groups. Firstly, simple descriptive statistics, specifically, means, standard deviations, and standard error mean, were employed to report the data collected from the pre-tests and post-tests.

To compare the differences between the two groups in improving the EFL students' writing performance in terms of overall scores, five sub-scores of writing performance, independent sample t-test, and one-way MANOVAs were run, respectively. The independent sample t-test compared the mean differences between the experimental and control groups from pre-tests to post-tests. The mean differences were calculated using the formula [post-tests' overall scores – pre-tests' overall scores].

A one-way MANOVA was then used to evaluate the differences between the two groups in developing EFL learners' writing performance regarding the five sub-scores (e.g., content, organization, vocabulary, grammar, and mechanics) by using the mean differences in each sub-score from the pre-tests to post-tests between the experimental and control groups.

Lexical Richness. The participants' pre-tests and post-tests in each group were assessed regarding their lexical density, sophistication, and diversity. The lexical density, sophistication, and diversity measures used the ratio of the number of lexical words to the total number of words in a text, the proportion of relatively unusual or advanced words in the student's text, and the standard type-token ratio, respectively. The three dimensions were calculated using VocabProfilers, developed by Tom Cobb.

One-way MANOVAs were performed to indicate whether there were any statistically significant differences between the two groups' post-tests on the three dimensions of lexical richness after implementing the two instructional procedures. The students' post-test scores were analyzed and compared between the two groups to see there were any potential significant differences between the two groups.

Self-Regulated Learning Questionnaire. After the course, a paired sample t-test was employed to compare the pre-questionnaire and post-questionnaire responses of the experimental group participants to identify any significant differences between them and then to examine the positive training effects in general. The comparative analysis was performed and illustrated in the three stages of self-regulated learning: forethought, performance, and self-reflection.

Qualitative Data Analysis—Face-to-Face Focus-Group Interviews. According to Braun and Clarke (2006, p. 6), the thematic analysis approach refers to "a method for identifying, analyzing, and reporting patterns (themes) within data." Therefore, the thematic analysis approach (Braun & Clarke, 2006) was adopted to analyze the developmental process of learners' writing self-regulation capacities within the technology-based language learning environment. The analysis focused on participants' attitudes toward the use of self-regulation training in writing classes, the impacts of the training on learners' academic writing performance, the development of learners' writing self-regulation in technology-mediated language learning, and the difficulties or problems they encountered during the self-regulation training course to enhance the self-regulated learning strategy use in the writing course.

All the qualitative data from the face-to-face focus-group interviews were transcribed. All interview transcripts were translated into English by the researcher. Then a Vietnamese teacher teaching English at the Hue University of Foreign Languages and International Studies in Vietnam helped the researcher check the accuracy of the translation by listening to the recordings. The researcher attentively reviewed all of the interview transcripts several times to gain an overall thorough comprehension of the major ideas expressed. The

transcripts of the interviews were then initially codified using open thematic coding to identify the most important core themes about the EFL students' perceptions of the impact of the self-regulated writing training supported by technology on their academic writing performance and their self-regulation development in writing class. Subsequently, the interrelationships among the core themes were recognized and categorized based on their content (i.e., axial coding). Finally, each group of themes acquired a label covering the shared theme within that group (i.e., labeling). A reiterative and bottom-up approach was employed to identify the major themes (i.e., open thematic coding) and their subsequent classification into related categories (i.e., axial coding and labeling). The following excerpt from the transcribed reflection of one of the participants indicated how the group interview data were analyzed:

> This writing course was exciting to me. (1) I really enjoyed exploring many suggested games and online applications used to expand my academic language by myself outside the classroom, and (2) I looked forwards to receiving others' feedback, especially from outstanding students…(3) This course helps me realized technology as one of the useful learning tools even in writing skill. I think using technology in writing class (4) helps us experience a wide range of online resources and materials compared to the writing class I have learned ….

As is shown, the transcribed piece was broken down into four "chunks." Chunk 1 shows the students' engagement in self-experiencing online learning resources outside the classroom; therefore, it was clustered in the "individual responsibility" theme under the "improvement of individual writing" category. Chunk 2, the participant's motivation for receiving peer

feedback, was clustered in “peer feedback and self-revision” theme under the “improvement of individual writing” category. Chunk 3, which shows the student’s change in perception toward the role of technology for language learning, was grouped in “positive attitude toward technology for writing learning” theme under the “improvement of technology autonomy” category. Chunk 4 highlights the wide range of online resources and materials the student could experience in the writing class, so it was grouped into “varied authentic e-resources and e-channels” theme under the “diverse and personalized learning environment” category.

To guarantee inter-coder reliability (Gass & Mackey, 2000), the open coding, categorizing, and labeling procedures were examined by the researcher and another EFL lecturer, and any disagreements were discussed and resolved. An inter-encoder agreement of 85% was achieved.

4.8. Reflection as a Researcher

Appropriate positioning is an important factor for qualitative researchers. Researchers are advised to be aware of not only how their teaching experience is associated with the phenomena being studied but also how their experience and knowledge influence their data interpretation and the conclusions drawn from the findings of the study (Creswell & Guetterman, 2019). This means that appropriate positioning involves self-reflection as a researcher in analyzing and interpreting qualitative data.

The researcher is the sole researcher of the study, and her major, English Language Teaching, was the same as that of the participants, who are studying English Language Teaching as their major. However, the researcher has never taught a training course, which inspired her to

investigate the participants' reflections on the impacts of the self-regulation training in writing skills. Moreover, the researcher is an outsider with a certain distance from the participants to some degree because she lived and studied outside of Vietnam for four years during her Ph.D. studies. With the above background, she can protect against subjectivity in understanding and interpreting the data.

The relationship between the researcher and the participants also directly impacts the data collection process. Before data collection, she went to the participants' writing classroom to introduce the training and deliver the consent forms. As an English lecturer at the university, she felt connected and close to the participants. During the training, the researcher attempted to build up a good rapport with all participating students with sincerity and a strong motivation to learn.

4.9. Ethical Considerations

Researchers must be especially sensitive to ethics when carrying out research (Creswell & Guetterman, 2019). She tried to guarantee the ethical principles of respecting, understanding, and trusting all the student participants of the study. All the research participants took part in the research of their own volition. They were fully aware of the research purpose and procedures before the training; therefore, they demonstrated a cooperative commitment.

After receiving permission from the teachers and student participants, she delivered to each of them a paper-based consent statement (see Appendix B) and promised that all personal information and collected data would be used only for the research purpose to ensure confidentiality. The names of the participants were all pseudonyms. Furthermore, before

conducting the training and data collection procedures, the researcher achieved ethical approval from Human Research Ethics Committee on December 27, 2019 (Appendix A).

Seeking voluntary participants for focus-group interviews was challenging. And finding around 20 voluntary participants willing to attend middle-of-training and end-of-training interviews was even more difficult. For example, the researcher recruited 23 participants for the focus-group interviews in case some of them withdrew from the study during the training. In the end, three out of the 23 participants took part only in the middle-of-training interviews and did not participate in the end-of-training interviews due to personal reasons. The researcher had to remove all the responses and sharing collected from these participants' middle-of-training interviews and did not use them in the data analysis and interpretation.

4.10. Chapter Summary

The methodology chapter provided an overview of the methodological perspectives of the research. Both quantitative and qualitative research methods were applied in the 15-week academic essay-writing course. A total of 78 EFL students was categorized into two groups (i.e., experimental and control groups) constituted the research participants in the study. While the quantitative data were collected through timed essay-writing tests (i.e., pre-tests and post-tests) and self-regulated learning questionnaires (i.e., pre-questionnaire and post-questionnaire), the qualitative data were collected through focus-group interviews (i.e., in the middle of and after the training) among the 20 participants from the experimental group. To analyze the quantitative and qualitative data in depth, t-tests, one-way MANOVAs, and thematic analysis approaches were used. This chapter aimed to describe a clear picture of the training and give detailed information on the research procedures, data collection

instruments, and data analysis methods with sufficient ethical considerations. The methodology descriptions and findings of the pilot study will be summarized in the following chapter.

Chapter 5: Results – The Training's Influence on EFL Learners' Writing Performance

The methodology chapter provided information on the description of the research context, participants, data collection instruments, and data collection procedures and analysis. This chapter reports the quantitative findings collected from the pre-tests and post-tests to address the first main RQ: *"How does learner training in self-regulated writing supported with technology influence EFL learners' individual writing performance?".* The independent, MANCOVAs are used to report the data collected from the pre-tests and post-tests.

This first RQ aimed to examine whether the self-regulated writing training supported with technology developed the EFL students' academic writing performance regarding overall scores, five sub-scores of writing performance (e.g., content, organization, vocabulary, grammar, and mechanics) and lexical richness (e.g., lexical density, sophistication, and diversity).

5.1. Overall Scores

Descriptive statistics of the EFL students' pre-tests and post-tests on the individual writing essays were first conducted. The results are shown in Table 12.

Table 12

Descriptive Statistics of the Pre-Tests and Post-Tests of Writing Performance

	Groups	N	Mean	Std. deviation	Std. error mean
Pre-tests	Experimental	34	7.24	0.70	0.12
	Control	44	7.19	0.79	0.12

Post-tests	Experimental	34	8.21	0.64	0.11
	Control	44	7.60	0.35	0.05

According to Table 1 in the methodology chapter, the independent t-test shows that the difference is insignificant (p = 0.15) between the mean scores of the pre-tests of both experimental and control groups. However, Table 12 indicates the mean differences were noticeable for the post-tests. As Table 12 shows, the mean of the post-tests in the experimental group (M = 8.21, SD = 0.64) was higher than that in the control group (M = 7.60, SD = 0.35). To determine whether these differences were statistically significant, further analyses were carried out.

An independent samples t-test was performed to find the differences between the impact of technology-enhanced self-regulation training and the lack thereof in the conventional writing classroom on developing EFL learners' academic writing performance. First, Kolmogorov-Smirnov and Shapiro-Wilk tests were run to check the normality of the data and to control for any outliers. The findings revealed that the data were normal in the experimental and control groups and that there were no outliers.

An independent samples t-test was employed to investigate the possible differences in improving EFL learners' writing performance (i.e., overall scores) between the two groups after applying the two instructional programs. The findings of the independent samples t-tests are summarized in Table 13.

Table 13

Independent t-Test Investigating the Differences in Improving Writing Performance Regarding Overall Scores Between the Two Groups

Measures	Experimental Group (N = 34)		Control Group (N = 44)				[a]Cohen's d
	M	SD	M	SD	*t*	*p*	*d*
Pre-post difference	0.33	0.37	0.05	0.60	2.43	0.02*	0.56

Note. $*p < 0.05$

[a] Cohen's d effect size: small ($d = 0.2$); medium ($d = 0.5$); large ($d = 0.8$)

It is illustrated in Table 13 that there were significant differences between the experimental and control groups in improving overall writing scores from the pre-tests to post-tests ($t = 2.43$, $p = 0.02$; $d = 0.56$). The effect size ($d = 0.56$) was found to exceed Cohen's (1988) convention for a medium effect size ($d = 0.5$). Therefore, it was revealed that technology-enhanced self-regulation training had a medium effect on improving the participants' writing performance regarding the component of overall writing scores ($d = 0.56$).

The current study showed the effectiveness of self-regulation training in improving students' overall positive writing outcomes, which enriches the conclusions of most previous research examining self-regulation training in online learning contexts, such as writing flipped, online or blended learning environments (e.g., García Botero et al., 2021; Göy, 2017; Öztürk & Çakıroğlu, 2021; Raja et al., 2022; van Alten et al., 2020; Woottipong, 2022; Zhu et al., 2016).

5.2. Five Sub-Scores of Writing Performance

Table 14 reported the descriptive statistics of the EFL students' sub-scores of writing performance in the pre-tests and post-tests of both the experimental and control groups.

Table 14

Descriptive Statistics of EFL Students' Sub-Scores of Writing Performance in the Pre-Tests and Post-Tests

	Groups	Dependent variables	N	Mean	Std. deviation	Std. error mean
Pre-tests	Experimental	Content	34	7.73	0.59	0.10
		Organization		8.09	0.87	0.15
		Vocabulary		6.71	0.72	0.12
		Grammar		6.50	0.96	0.16
		Mechanics		9.35	0.65	0.11
	Control	Content	44	7.95	0.52	0.08
		Organization		8.14	0.73	0.11
		Vocabulary		6.89	0.54	0.08
		Grammar		6.52	0.76	0.11
		Mechanics		9.16	0.53	0.08
Post-tests	Experimental	Content	34	8.74	0.47	0.09
		Organization		8.51	0.64	0.11
		Vocabulary		7.92	0.54	0.09
		Grammar		7.65	0.64	0.12
		Mechanics		9.63	0.43	0.11
	Control	Content	44	8.18	0.53	0.08

Organization	8.19	0.65	0.10
Vocabulary	7.24	0.55	0.08
Grammar	7.02	0.70	0.10
Mechanics	9.30	0.73	0.09

The results of Table 14 indicate that the means for all five sub-scores of writing performance in the post-tests were higher than those in the pre-tests in both groups. In other words, the participants in both groups achieved improvement in most of the five sub-scores of writing performance from the pre-tests to post-tests. In addition, the findings reveal that the students in the experimental group outperformed those in the control group in all five sub-scores of writing performance. However, to examine whether these amounts of improvement were statistically significant, further analyses were conducted.

MANOVAs were also applied to investigate the differences between the two groups in developing the participants' writing performance regarding the five sub-scores of writing performance. Before conducting the MANOVAs, preliminary checks were applied to guarantee that there were no violations of normality, linearity, and homogeneity of variances. The findings showed no violation of data, which allowed for further analyses. Table 15 presents the MANOVA results.

Table 15

MANOVA Test Investigating the Differences in Improving Students' Writing Performance Regarding Five Sub-Scores of Writing Performance Between the Two Groups

Dependent variable	Type III sum of squares	df	Mean square	F	Sig	[a]Partial eta squared ($\eta p^{2)}$
Content	11.45	1	11.45	38.94	0.000 **	0.33

Pre-post	Organization	2.60	1	2.60	6.16	0.02*	0.08
difference	Vocabulary	14.22	1	11.42	51.01	0.000 **	0.40
	Grammar	8.30	1	8.30	30.44	0.000 **	0.28
	Mechanics	0.40	1	0.40	0.92	0.35	0.01

Note. *$p < 0.05$; **$p < 0.01$

[a]Partial eta squared **(**ηp^2): small effect $\eta p^2 = 0.01$; medium effect: $\eta p^2 = 0.06$; large effect: $\eta p^2 = 0.14$

It is indicated in Table 15 that there were significant differences between the experimental and control groups in developing the students' writing performance from the pre-tests to the post-tests regarding the sub-components of content, organization, vocabulary, and grammar, with [F (1,76) = 38.94, p = 0.00, ηp^2 = 0.33], [F (1,76) = 6.16, p = 0.02, ηp^2 = 0.08], [F (1,76) = 51.01, p = 0.00, ηp^2 = 0.40], and [F (1,76) = 30.43, p = 0.00, ηp^2 = 0.28], respectively. It was found that these analyses achieved a large effect ($\eta p^2 > 0.14$), except for the sub-component of organization, with a medium effect size ($\eta p^2 = 0.08$). However, the sub-component of mechanics did not reach statistical significance, with [F (1,76) = 0.92, p = 0.33].

The aforementioned findings demonstrated that the sub-scores of content, vocabulary, and grammar produced by the experimental group were significantly higher than those produced by the control group, with a large effect ($\eta p^2 > 0.14$), and that the sub-score of organization had a medium effect size ($0.14 > \eta p^2 > 0.06$). Although the scores of mechanics produced by the experimental group were higher than those produced by the control group, these differences did not reach statistical significance.

This result has extended the positive findings of previous studies in that self-regulated writing training fosters improved writing skills in terms of the organization of ideas and content

(Göy, 2017) and improved story quality regarding the organization component (e.g., introduction, main body paragraph, and ending) (Glaser & Brunstein, 2007). In addition, these findings consistently support the previous studies' conclusions that self-regulated writing training can foster improved writing skills in grammar component by developing the grammatical completeness of the story (Glaser & Brunstein, 2007) and encouraging EFL writers to tackle problems related to vocabulary and grammar through collaborative writing, peer assistance, and error correction activities (Engin & Donanci, 2016; Öztürk & Çakıroğlu, 2021; Wu et al., 2017).

5.3. Lexical Richness

Table 16 presents the descriptive statistics of the participants' sub-scores in lexical richness in the pre-tests and post-tests of both groups.

Table 16

Descriptive Statistics of EFL Students' Sub-Scores of Lexical Richness in the Pre-Tests and Post-Tests

	Groups	Dependent variables	N	Mean	Std. deviation	Std. error mean
Pre-tests	Experimental	Lexical density	34	0.51	0.04	0.01
		Lexical sophistication		0.47	0.13	0.02
		Lexical diversity		60.70	18.30	3.14
	Control	Lexical density	44	0.52	0.07	0.01
		Lexical sophistication		0.41	0.18	0.03
		Lexical diversity		62.67	17.87	2.69

Post-tests	Experimental	Lexical density	34	0.55	0.04	0.01
		Lexical sophistication		0.55	0.07	0.01
		Lexical diversity		81.53	14.86	2.54
	Control	Lexical density	44	0.50	0.05	0.01
		Lexical sophistication		0.47	0.09	0.01
		Lexical diversity		75.44	17.56	2.65

The results of Table 16 indicate that the means for all three sub-scores of lexical richness in the post-tests were higher than those in the pre-tests in only the experimental group. In the control group, the mean for the sub-score of lexical density in the post-tests (M = 0.50, SD = 0.05) was slightly lower than that in the pre-tests (M = 0.52, SD = 0.07). In other words, the students in the experimental and control groups gained improvement in most of the three sub-scores of lexical richness from the pre-tests to the post-tests except for the lexical density component in the control group. In addition, the results revealed that the students in the experimental group outperformed those in the control group in all three sub-scores of lexical richness. However, to check whether these amounts of improvement were statistically significant, further analyses were conducted.

MANOVAs were also adopted to further evaluate the differences between the two groups in enhancing the EFL learners' writing performance regarding the three dimensions of lexical richness (e.g., lexical density, sophistication, and diversity) from the pre-tests to the post-tests. Table 17 shows the results of the MANOVAs.

Table 17

MANOVA Test Investigating the Differences in Improving Students' Writing Performance Regarding Lexical Richness Between the Two Groups

	Dependent variable	Type III sum of squares	df	Mean square	F	Sig	[a]Partial eta squared (ηp^2)
Pre-post difference	Lexical density	0.03	1	0.03	4.76	0.03*	0.06
	Lexical sophistication	0.11	1	0.11	15.78	0.000**	0.17
	Lexical diversity	1246.18	1	1246.18	4.51	0.04*	0.06

Note. $*p < 0.05$; $**p < 0.01$

[a]Partial eta squared (ηp^2): small effect $\eta p^2 = 0.01$; medium effect: $\eta p^2 = 0.06$; large effect: $\eta p^2 = 0.14$

It is indicated in Table 17 that there were significant differences between the experimental and control groups in developing the students' writing performance from the pre-tests to the post-tests regarding the sub-components of lexical density, sophistication, and diversity, with [F (1,76) = 4.76, p = 0.03, ηp^2 = 0.06], [F (1,76) = 15.78, p = 0.000, ηp^2 = 0.17], and [F (1,76) = 4.51, p = 0.04, ηp^2 = 0.06], respectively. It was found that these analyses achieved a large effect size ($\eta p^2 > 0.14$) in the sub-component of lexical sophistication and a medium effect size in the sub-components of lexical density and diversity ($\eta p^2 = 0.06$).

5.4. Chapter Summary

Overall, this chapter has presented the impact of the self-regulation training supported with technology on the EFL learners' academic writing performance through three main writing aspects (e.g., overall writing scores, sub-components of writing performance, and lexical richness). Independent t-tests and MANOVAs were performed to identify whether there were any statistically significant differences between the two groups in improving their individual writing performance in terms of overall scores, the five sub-scores of writing performance

(e.g., content, organization, vocabulary, grammar, and mechanics) and lexical richness (e.g., lexical density, sophistication, and diversity) from the pre-tests to the post-tests. The quantitative findings indicated that the experimental group achieved significantly better performance than the control group in most of the measures (e.g., overall writing scores, sub-scores of writing performance, and lexical richness). Therefore, it is suggested the training helped them improve their individual writing performance in many aspects of academic writing learning (e.g., essay organization, content, grammar, vocabulary, and lexical richness) from the pre-tests to the post-tests. It could thus be revealed that the technology-enhanced self-regulation training had a medium to large size effect on developing EFL learners' academic writing performance than the lack of such training in conventional writing classroom. These positive findings indicated that self-regulated writing training was potentially one of the most effective learning spaces for most EFL students and helped them become more competent and self-regulated EFL student writers.

Chapter 6: Results – The Training's Influence on EFL Learners' Writing Self-Regulation Capacities

This chapter reports the quantitative and qualitative findings collected from the self-regulated learning Likert-scale pre- and post-questionnaires and the face-to-face focus-group interviews to address the second main RQ: *"How does learner training in self-regulated writing supported with technology help EFL learners change their perceptions of the improvement of self-regulation capacities in writing skills?".* The paired sample t-tests are used to report the data collected from the pre-tests and post-tests and the questionnaires, followed by a report of the content analysis and categorization for the qualitative data collected from the face-to-face focus-group interviews.

To answer the second RQ, a paired sample t-test was performed as quantitative data to compare the self-regulated learning pre- and post-questionnaires of the students in the experimental group and then to examine whether there were any positive training effects in general. In addition, by analyzing the transcribed interviews through thematic analysis as qualitative data, some themes were generated that addressed the students' perceptions of the influence of the training on their improvement in academic writing performance and self-regulated writing capacities. Overall, the results indicated that the participants had a positive study experience in their writing classroom and thought that the training course was quite helpful in initially constructing their writing confidence and motivation and improving their self-regulated writing and technology autonomy with the support of diverse and personalized learning environments in the CALL context. The quantitative and qualitative findings are shown in the following tables.

6.1. Perceptual Changes Toward Learners' Self-Regulated Strategy Use in Writing Skills

To answer the second RQ, the paired sample t-test was computed to explore whether there are any perceptual changes toward learners' self-regulated strategy use in writing skills. The learners' responses were presented based on the three main phases of the self-regulated learning approach: phase I—forethought, phase II—performance, and phase III—self-reflection. Phase I was measured under five key constructs: (1) learning goal and planning (4 items), (2) self-efficacy beliefs for mobile learning (4 items), (3) self-efficacy for language learning (3 items), (4) intrinsic motivation (3 items), and (5) extrinsic motivation (3 items). Phase II was measured under seven key constructs: (1) task strategies (5 items), (2) time management (3 items), (3) environment (3 items), (4) self-rewarding (3 items), (5) maintain interest (3 items), (6) emotion (4 items), and (7) self-observation (3 items), followed by three key constructs of phase III—self-reflection, including (1) self-evaluation (4 items), (2) task strategies evaluation (3 items), and (3) future planning (3 items). Table 18 shows the results of paired sample t-test, which compares the participants' responses between the pre-questionnaire and the post-questionnaire.

Table 18

Paired Sample t-Test Comparing Participants' Pre- and Post-Questionnaire Responses (n = 34)

Phase	Construct	Item	Range		Mean	SD	T	Sig
Phase I—	Learning goals &	4	1–6	Pre	4.35	0.09	3.65	0.04 *
Forethought Phase	planning			Post	4.79	0.24		

	Self-efficacy beliefs for mobile learning	4	1–6	Pre	3.54	0.30	5.16	0.01 *
				Post	4.45	0.30		
	Self-efficacy belief for language learning	3	1–6	Pre	3.99	0.26	4.65	0.04 *
				Post	4.59	0.34		
	Intrinsic motivation	3	1–6	Pre	3.76	0.21	3.94	0.06
				Post	4.96	0.47		
	Extrinsic motivation	3	1–6	Pre	3.29	0.28	8.23	0.01 *
				Post	4.88	0.58		
Phase II—	Task strategies	5	1–6	Pre	3.94	0.37	5.14	0.01 *
Performance Phase				Post	4.58	0.12		
	Time management	3	1–6	Pre	3.71	0.54	2.20	0.16
				Post	4.48	0.14		
	Environment	3	1–6	Pre	3.80	0.32	13.30	0.01 *
				Post	4.69	0.25		
	Self-rewarding	3	1–6	Pre	3.33	0.40	10.98	0.01 *
				Post	4.45	0.23		
	Maintaining interest	3	1–6	Pre	3.62	0.48	3.16	0.09
				Post	4.48	0.08		
	Emotion	4	1–6	Pre	3.78	0.25	7.14	0.01 *
				Post	4.86	0.13		
	Self-observation	3	1–6	Pre	3.47	0.24	10.62	0.01 *
				Post	4.56	0.41		
Phase III—	Self-evaluation	4	1–6	Pre	3.45	0.53	7.55	0.01 *
Self-reflection Phase				Post	4.39	0.33		
	Evaluating the task strategies	3	1–6	Pre	3.52	0.40	3.71	0.07
				Post	4.74	0.18		

Future planning	3	1–6	Pre	3.85	0.13	4.36	0.05
			Post	4.82	0.51		

Note. *$p < 0.05$

For the forethought phase, the participants rated their capacities of learning goal and planning (M = 4.79, SD = 0.24), their self-efficacy beliefs for mobile learning (M = 4.45, SD = 0.30) and for language learning (M = 4.59, SD = 0.34), their perceptions of intrinsic motivation (M = 4.96, SD = 0.47), and their perceptions of extrinsic motivation (M = 4.88, SD = 0.58) in the post-questionnaire more positively than in the pre-questionnaire, with (M = 4.35, SD = 0.09), (M = 3.54, SD = 0.30), (M = 3.99, SD = 0.26), (M = 3.76, SD = 0.21), and (M = 3.29, SD = 0.28), respectively. It is indicated in Table 14 that the participants perceived significantly more positive attitudes toward their capacities of learning goal and strategy planning (t = 3.65, p = 0.04), their self-efficacy beliefs for mobile learning (t = 5.16, p = 0.01) and for language learning (t = 4.65, p = 0.04), and their perceptions of extrinsic motivation (t = 8.23, p = 0.01). Although the participants in the experimental group reported greater confidence in their perceptions of intrinsic motivation, the difference did not reach statistical significance (t = 3.94, p = 0.06). The effect size of these analyses ($d > 0.8$) was found to exceed Cohen's (1988) convention for a large effect (d = 0.80) in the participants' perceptions of their capacities of learning goal and strategy planning, their self-efficacy beliefs for mobile learning and for language learning, and extrinsic motivation.

These findings provide empirical support for Woottipong's (2022) study, which reported a significant effect of a writing class integrated with self-regulation instruction on three sub-categories, with large effect size, including language learning self-efficacy, self-regulatory efficacy, and writing performance self-efficacy. However, the present research's

finding is partially in contrast to Broadbent et al.'s (2020) study, in which the students in the combined condition (online training plus mobile app-based condition) did not perceive any significant improvement in both intrinsic and extrinsic goal orientation.

Among the factors associated with the performance phase, the participants showed significantly greater confidence in finding learning techniques and strategies to facilitate their language learning tasks (t = 5.14, p = 0.01). In addition, they indicated significantly more positive attitudes toward the skills of seeking a good learning environment (t = 13.30, p = 0.01) and their capacities for self-rewarding (t = 10.98, p = 0.01) and self-controlling their emotions (t = 7.14, p = 0.01) in language learning in the post-questionnaire than in the pre-questionnaire. The participants also reported significantly more positive perceptions of self-observation and their language learning progress in the post-questionnaire than in the pre-questionnaire (t = 10.62, p = 0.01). The scores for the skills of time management and interest maintenance in the post-questionnaire were higher than those in the pre-questionnaire, but no significant differences were found (t = 2.20, p = 0.16 and t = 3.16, p = 0.09, respectively). The effect size of these analyses (d > 0.8) was found to exceed Cohen's (1988) convention for a large effect (d = 0.80) in the participants' perceptions of their skills in task strategies, seeking a good learning environment, self-rewarding, self-controlling emotions, and self-observation.

For the self-reflection phase, a comparison of the participants' responses in the pre- and post-questionnaires indicated that the participants showed significantly greater confidence in self-evaluating their learning progress (t = 7.55, p = 0.01). The results indicated that the participants in the experimental group demonstrated increases in the measures related to task strategy evaluation and future planning, but their differences between the pre- and post-

questionnaires did not reach statistical significance (t = 3.71, p = 0.07 and t = 4.36, p = 0.05, respectively). The effect size of these analyses (d > 0.8) was found to exceed Cohen's (1988) convention for a large effect (d = 0.80) in the participants' perceptions of their abilities in self-evaluation.

6.2. Self-Perceived Improvement of Writing Self-Regulation Capacities

Qualitative data collection and analyses were conducted to explain the quantitative results discussed above further. As there were differences between the participants' responses in the pre- and post-questionnaire, qualitative data collections analyses (i.e., face-to-face focus-group interviews in the middle of and after the course) were carried out with the students in the experimental group to clarify the results of the study further and gain a thorough and detailed understanding of the results.

6.2.1. Positive Student Perceptions.

Table 19 shows the categories and themes of the participants' positive perceptions of the impact of the technology-enhanced self-regulation training on EFL learners' academic writing performance and the development of learners' writing self-regulation. The related themes have been grouped into different categories. As mentioned in Table 19, five categories along with 19 themes were uncovered to address the participants' attitudes and perceptions collected from focus-group interviews.

Table 19

Categories and Themes Addressing the EFL Students' Positive Attitudes Toward and Perceptions of Self-Regulation Training with Technology

Categories	Themes	Frequency	Percentage
1. Development of writing confidence	a. Goal setting	27	34%
	b. Strategy planning practice	23	29%
	c. Technology assistance	30	37%
	Total	**80**	**100%**
2. Development of writing motivation	a. Supportive collaboration	29	27%
	b. Group engagement	21	37%
	c. Multi-directional scaffolding	29	36%
	Total	**79**	**100%**
3. Improvement of individual writing strategies	a. Individual responsibility	30	22%
	b. Peer feedback and self-revision	22	16%
	c. Self-improvement	19	14%
	d. Writing efficiency	26	19%
	e. Self-evaluation of learning strategies	19	14%
	f. Self-evaluation of learning resources	22	15%
	Total	**138**	**100%**
4. Improvement of technology autonomy	a. Positive attitude toward technology for writing learning	31	36%
	b. Increased use of technology use for writing learning	27	31%
	c. Enhanced self-efficacy in technology use for writing learning	29	33%

	Total	**87**	**100%**
5. Diverse and personalized learning environment	a. Varied authentic e-resources and e-channels	32	34%
	b. Integration writing skills with other language skills	15	16%
	c. Learning according to learning styles	23	24%
	d. Flexible learning space and time	25	26%
	Total	**95**	**100%**

Development of Writing Confidence. The first category addressed the positive impact of self-regulated writing training on the students' development of writing confidence. Many participants believed the training could boost their self-confidence in writing tasks via initial preparation through goal setting, strategy planning, and technical assistance in writing class.

Before the training course, when asked about the writing procedures they often followed to complete writing tasks, nearly all the participants shared that they just read the questions associated with the writing tasks, spent a little time brainstorming ideas in their minds, and then mainly focused on their writing. They did not have a habit of making outlines and analyzing what essay structures or suitable academic language structures should be used in their writing because they were afraid of the limited time. They also shared that they sometimes had difficulties starting their writing and finding persuasive supporting ideas for their main ideas. For example, L3 and L13 mentioned the following:

> Sometimes, I spend much time writing my introduction because I do not know how to organize my essay or what I should do to catch the reader's interest in my writing effectively. Sometimes, my writing is out of topic or gets the wrong essay structure as the requirements of the task. (L3, focus-group interview)

> Sometimes, I felt so stressed when I get stuck in my writing because I cannot know how to develop my main ideas, such as finding appropriate supporting ideas or relevant examples for my main ideas. (L13, focus-group interview)

***Goal-Setting Practice*.** Through the face-to-face focus-group interviews in the middle of and after the training course, most participants observed that their development of goal setting and strategy planning gradually made them more confident in writing. As the participants were trained about the stages of the writing process and the useful writing strategies needed in the writing process in the section on pedagogical and strategic training, they could increase their understanding of the nature of the writing process and the specific purposes of each learning activity in writing classes (L2, focus-group interview). In addition, they reported that pedagogical and strategic training encouraged them to critically focus on the goal-setting procedure, such as the expected requirements of the assignments (L6, focus-group interview) and what teachers' marking criteria entailed regarding excellent work (L3, focus-group interview). Therefore, according to many students, a full understanding of the writing process and writing tasks possibly contributed to developing the students' writing confidence.

Strategy-Planning Practice. In the face-to-face focus-group interviews after the course, some participants also added that they felt more confident in writing their essays by

focusing on planning the strategies needed in their writing procedure or what expected techniques or skills should be used in the assigned writing tasks (L9 & L5, focus-group interview). Table 20 shows examples of the "goal setting practice" and "strategy planning practice" themes.

Table 20

Development of Writing Confidence (Goal-Setting and Strategy-Planning Practice)

Categories	Themes	Examples
1. Development of writing confidence	a. Goal-setting practice	**L2:** *The training helps me know more about the types of writing, the steps needed in writing practice, and the purpose of each step. I stuck on that, and then I realized my writing had become faster.* **L6:** *At the beginning of the course, the teacher helps me analyze the differences in essay writing. Understanding the special requirements of essay writing, such as language and organization, helps me save time in writing.* **L3:** *After the training, I often consider the marking criteria before writing an essay. It helps me know what the teacher expects toward an excellent paper according to criteria such as content, organization, language use, and punctuation.*
	b. Strategy-planning practice	**L9:** *After the training, I often carefully underline the requirements of the tasks. Based on these requirements, I can find suitable strategies before writing. It helps me avoid being out of topic or writing in the wrong direction.* **L5:** *I was weak in writing, and it took time to start writing, especially in academic writing. The strategies provided in the training course gave me more confidence to complete the writing*

	because I know exactly what steps I should follow and what strategies I should use.

Technology Assistance. The participants further reported that the assistance of technology diminished their writing anxiety to some extent. They described the technological learning tools and platforms as a user-friendly learning space due to their convenience, colorful and lively layout, and rich language learning materials (L1, focus-group interview). Therefore, they shared that the technical support allowed the students to escape from the boundaries of face-to-face communication in the conventional writing classroom, facilitate their writing process (e.g., idea brainstorming, peer feedback, and self-revision), and then reduce their writing anxiety (L12, focus-group interview). Table 21 shows examples of the "technology assistance" theme.

Table 21

Development of Writing Confidence (Technology Assistance)

Categories	Themes	Examples
1. Development of writing confidence	c. Technology assistance	**L1:** *Initially, using technology in writing class was a challenging experience. After around 6 weeks of practicing, I found it quite easy to use and eye-catching due to its colorful and lively layout, detailed guidelines, and various types of practice activities. Then I became less anxious gradually when using it to support my writing.* **L12:** *I feel less stressed when making an online outline with my friends because we are not limited by time and space as in my previous writing courses. I also feel more confident when giving peer feedback and self-revise my writing with the support of technology, such as Grammarly, online dictionaries, and corpus-based platforms.*

Development of Writing Motivation. Before the writing course, all the participants described their writing practice as an individual activity rather than a collaborative activity. For example, brainstorming tasks were thought of as individual or pair activities rather than group activities. Therefore, L14 and L20 stated the following:

> I often work individually to brainstorm ideas for my essay papers. Then we are asked to work in pairs to compare their outline together. Normally, I rarely comment on my peer's outline and rarely change mine. (L14, focus-group interview)

> We often work individually in writing class. We sometimes work in pairs in peer feedback, and rarely work in groups. (L20, focus-group interview)

Additionally, most participants mentioned a low level of motivation for using technology as one of the learning tools in writing class and a low commitment to taking part in self-practice writing activities beyond the classroom before the training. For example, L10 and L13 explained the following:

> Although I know technology can be a useful learning tool, I have not known how to apply it to my language learning effectively (L10, focus-group interview).

> Some handouts of self-study activities were provided, but they were not compulsory. Therefore, I just finished a few. (L13, focus-group interview)

The training course was designed to organize more group discussions and group work activities in and beyond the classroom. In the writing course, the trainers also were guided to brainstorm online in groups through interactive mind-map tools and then upload their drafts

for peer and instructor feedback via the functions of online editing tools (e.g., Google Docs, Zoho Docs) and online group conversation (e.g., Zoho Docs). Compared to the individual writing activities in the conventional classroom, most of the participants shared that group work was found to be beneficial because it increased students' learning motivation, learning commitment, and engagement in writing practice thanks to the convenience of the online collaborative learning platforms.

***Supportive Collaboration*.** The first emerged theme in the "development of learning motivation" category highlighted the supportive collaboration outside of the writing classroom. For example, participants found that the flexible functions of the online group discussion and editing tools motivated them to share and exchange ideas compared to the limited space of face-to-face communication (L4, focus-group interview), enhanced social interaction in language learning through the user-friendly and eye-catching display functions (L8, focus-group interview), and enhanced supportive cooperation in tackling learning difficulties together (L9, focus-group interview). Table 22 shows examples of the "supportive collaboration" theme.

Table 22

Development of Learning Motivation (Supportive Collaboration)

Categories	Themes	Examples
2. Development of learning motivation	a. Supportive collaboration	**L4:** *With technology, group work beyond the classroom motivates me to share ideas and contribute to group work more without the pressure of face-to-face communication.* **L8:** *The colorful and lively display functions attract me to engage more in offering opinions, discussing in the group, and practicing writing.*

	L9: *Working online and in groups allows us to clarify course requirements, discuss what we have not understood, and deal with learning difficulties together. It should be better than working and overcoming difficulties on my own.*

Group Engagement. Under the category "development of learning motivation," the students also stated that online group work and discussion motivated them by providing a special experience in which they could closely and fully work with other classmates (L1, focus-group interview) as well as learn from each other (L2, focus-group interview) and practice their critical thinking skills since they knew that their ideas were shared and then were judged by their peers (L5, focus-group interview). Table 23 shows examples of the "group engagement" theme.

Table 23

Development of Learning Motivation (Group Engagement)

Categories	Themes	Examples
2. Development of learning motivation	b. Group engagement	**L1:** *Group work experience in this writing is quite special because we can collaborate even beyond the walls of the classroom. We can add ideas to other peers, create, see, and change the content of essays together, not in paper but online.* **L2:** *In group, I can look at what was good from my peers and what I need to improve in my writing.* **L5:** *Group discussion forces me to self-monitor my thinking more carefully.*

In the traditional learning environment, teacher-enhanced scaffolding was the main assistance in class. Some participants were nervous when asking for peers' help, sharing their papers,

and generating peer feedback. Therefore, they shared that they rarely engaged in peer feedback activities and preferred editing their essays all by themselves rather than eliciting review from their peers.

***Multi-Directional Scaffolding*.** The training platform was designed based on the integration between in-class and outside-class learning environments. Therefore, the students argued that integrating learning environments made the bi-directional scaffolding between peers, peer-instructor, and peer-online resources expand to multi-directional scaffolding among online resources, peers, and instructors (L14, focus-group interview). That move promoted the dynamics of multiple interactions among learners and instructors in the language classroom (L6, focus-group interview). Table 24 shows examples of the "multi-directional scaffolding" theme.

Table 24

Development of Learning Motivation (Multi-Directional Scaffolding)

Categories	Themes	Examples
2. Development of learning motivation	c. Multi-directional scaffolding	**L14:** *In the training, I actively seek assistance from many e-channels such as training sites, online resources, my friends, and my instructor even out of the classroom, not merely the support of the teacher only as in the past.* **L6:** *The training site and online group discussion are a bridge between me, my peers, and the teacher, and then receive communication and support from various agents even beyond the classroom.*

Improvement of Individual Writing Strategies. Before the training course, most of the course members were not actually confident enough to describe themselves as an

independent learner in writing. In addition, they felt quite safe but not really engaged or motivated in the instructor-regulated learning environment. For example, L17 and L16 stated the following:

> Although I really want to become an independent learner in language learning, I feel I am still a passive learner. I try my best, but always follow my teachers' instructions or finish only writing tasks assigned by the teacher. (L17, focus-group interview)

> Sometimes, I felt quite bored with my study when just depending on my teacher, but I didn't know how to self-study effectively or find reliable reference resources and learning platforms for self-study. And then, although it's quite dull and not enough to practice my writing, I feel safe and easy when following my teacher's assignment only (L16, focus-group interview).

***Individual Responsibility*.** After the course, although the participants still evaluated highly the teacher's support and assistance in the classroom, they found that the training in self-regulated writing in the CALL environment activated their feelings of ownership and responsibility, to some extent, especially beyond the classroom. The participants gradually changed from passive learners to many different roles as active individuals in class, such as self-exploring the new online learning resources (L19, focus-group interview) and self-managing their writing process (L11, focus-group interview). Table 25 shows examples of the "individual responsibility" theme.

Table 25

Improvement of Individual Writing Strategies (Individual Responsibility and Peer Feedback & Self-Revision)

Categories	Themes	Examples
3. Individual writing strategies improvement	a. Individual responsibility	**L19:** *My teacher provides us with a list of learning websites and applications for self-study. We are encouraged to self-explore these new ones and then get a sense of autonomy in English writing.* **L11:** *The weekly online vocabulary exercises help me self-expand our academic language and structures, which supports me to self-manage my writing more easily.*
	b. Peer feedback & self-revision	**L7:** *Among the online tools for peer feedback offered in the course, I often choose Google Docs when giving and receiving peer feedback because I have used it before. It is also easy to navigate and offers exciting functions, which are suitable for doing peer feedback in groups.* **L8:** *Providing feedback helps me learn how the other students constructed their essays, and consequently, I can know how to make changes to improve my essay.* **L20:** *When receiving feedback on the draft of my peer, I am required to self-review and then develop my language accuracy in writing.* **L15:** *Because we are asked to give peer feedback and self-revise my essay following provided criteria, I also pay more attention to content and organization rather than grammar and spelling errors only as in the past when giving peer feedback and self-revising my essays.*

Although peer feedback was expected to create a mutual learning community, most of the participants actually had not found the effectiveness of this activity in the conventional writing class. This was explained by the limited time in the class, a lack of the necessary

skills to produce peer feedback, and the specific peer-feedback guidelines or instructions. For example, L26 stated the following:

> When giving feedback, we give overall positive comments such as "good" or "well-organized paragraphs" or "good writing structure," but we do not know any steps for giving feedback or any criteria when producing peer feedback. (L26, focus-group interview)

Peer-Feedback and Self-Revision. Regarding the "improvement of individual writing strategies" category, the students realized that peer feedback facilitated the process of self-revision and allowed them to improve their writing and was not merely an assignment or learning requirement of the writing course as they used to expect. The participants were encouraged to experience their peer-feedback activities through several tools for online text editing, such as Google Docs, Zoho Docs, and Track Changes in Word. Among the suggested tools, Google Docs was chosen most frequently by most of the participants due to its popularity, convenience, and user-friendliness (L7, focus-group interview). Moreover, peer feedback could be considered valuable learning resources in two distinctive directions. Some participants explained that the quality of their writing could be improved by not only comments from excellent students (L20, focus-group interview) but through the quality of these students' essays, including diversity of ideas, essay organization, and language structure (L8, focus-group interview).

In addition, the participants stated that the training greatly improved their peer feedback and self-correction abilities. During the course, the participants were guided on how to edit their peers' essays and make comments online according to the specific marking criteria and detailed instructions as well as how to revise their writing based on their peers' feedback with

the assistance of technology (e.g., online lexical applications, online dictionaries, and corpus-based learning platforms). Therefore, when giving peer feedback or self-revising their essays, they focused on both macrostructures (e.g., the essay's content and organization) and microstructures (e.g., vocabulary, grammar, and mechanics) compared to focusing on microstructures only, as in their previous writing classes (L15, focus-group interview). Table 25 shows examples of the "peer feedback and self-revision" theme.

Self-Improvement. The participants further argued that they felt more motivated to engage in writing activities because they knew how to self-manage their learning time and create their own learning path (L16, focus-group interview). In other words, the training made the students gradually transfer from instructor-regulated to self-regulated learning during the writing course.

Writing Efficiency. The next set of themes under the "improvement of individual writing strategies" category addressed the development of the students' writing efficiency. They reported that the strategies or techniques (e.g., making outlines, essay structures, useful academic language structures) in the training sessions helped them increase their writing speed and quality (L13, focus-group interview). Additionally, they mentioned the positive impact of in-class and outside-class extended learning activities as further writing practice opportunities for improving their writing performance (L8, focus-group interview). Table 26 shows examples of the "self-improvement" and "writing efficiency" themes.

Table 26

Improvement of Individual Writing Strategies (Self-Improvement and Writing Efficiency)

Categories	Themes	Examples

3. Improvement of individual writing	c. Self-improvement	**L16:** *The training changed my attitude toward writing practice, and I now realize that I can self-regulate my writing and know how to develop my writing on my own.*
	d. Writing efficiency	**L13:** *The strategies for idea brainstorming, and essay structures, language structures provided in the training support me in writing faster.* **L8:** *The extended writing activities in and outside the class help us have further writing practices. These contributed to improving our writing.*

***Self-Evaluation of Learning Strategies and Resources*.** The two last emerging themes in this category described the development of the students' self-evaluation of learning strategies and learning resources. Some of the participants were found to be more confident in evaluating their writing performance and their learning strategies after each completed learning activity. They compared pedagogical and strategic training as a useful guideline for them to evaluate what they have and have not achieved from the task, to analyze how the learning strategies are effective after the task (L12, focus-group interview), and to understand their own strengths and weaknesses in writing (L16, focus-group interview). They also added that they were encouraged to self-explore several technological learning resources to determine their preferred ones following their own learning styles and interest (L20, focus-group interview). The self-exploration of learning resources, according to many students, allowed them to analyze the strengths and weaknesses of each learning material or tool (L17, focus-group interview). Consequently, they could self-manage their study and personalize their learning environment. Table 27 shows examples of the "self-evaluation of learning strategies" and "self-evaluation of learning resources" themes.

Table 27

Improvement of Individual Writing Strategies (Self-Evaluation of Learning Strategies and Learning Resources)

Categories	Themes	Examples
3. Improvement of individual writing	e. Self-evaluation of learning strategies	**L12:** *The training provides a guideline to evaluate what I have and haven't achieved from the task and understand my strengths and weaknesses in my writing.* **L16:** *I gradually get familiar with the procedure from planning learning strategies, writing my essay, then analyzing and evaluating my writing paper during the course.*
	f. Self-evaluation of learning resources	**L20:** *Because the teacher provides a wide range of technological tools for each stage of the writing process, I first try all of them. Then I decide which ones suit my interest and learning styles.* **L17:** *After I experienced one of the e-learning materials, we were encouraged by its strengths and weaknesses. Gradually, I get the habit of self-evaluation my own learning resources and self-structure my own collection of e-learning materials, which will be useful for my self-study in the future.*

Improvement of Technology Autonomy. Another group of themes revolved around the learners' improvement of technology autonomy. The participants argued that the self-regulated writing training supported them in changing their use of technology for language learning. Before conducting the instructional procedure, the students in the experimental group described technology as an entertainment tool or a learning tool for only receptive language skills. L19 and L11, for instance, contended the following:

> Before this writing course, I only learned English mainly based on paper-based learning materials such as textbooks, reference books, and handouts from teachers. I only use online dictionaries or some online vocabulary or grammar games, but not frequently. (L19, focus-group interview)

> I am also suggested to use some online learning tools and materials for language learning in the previous semesters. For example, my teachers provided us with some websites to practice my listening skills and reading skills, not speaking and writing skills. So, this course is quite new for me. (L11, focus-group interview)

Positive Attitude Toward Technology for Writing Learning. After the writing self-regulation training course, most of the students reported that they gradually changed their perceptions of the role of technology in English learning from a platform merely for entertainment and for receptive skills to a useful and interesting learning tools for writing skills as well (L2, focus-group interview).

Increase in Frequency of Technology Use for Writing Learning. Some participants also expressed increased frequency and engagement in using technology for language learning because of its convenience, flexibility, and efficiency (L4, focus-group interview).

Self-Efficacy in Technology Use for Writing Learning. Furthermore, some students reported behavioral changes after the course, including an increase in the level of proficiency and confidence as well as in practical ways to enhance the impact of technology in language learning. Before the course, the participants evaluated their proficiency and confidence in using technology for language learning at a low level because of a lack of learning resources

and guidance out of the classroom. Even in the focus-group interviews in the middle of the course, many participants still felt quite disappointed because they faced many difficulties and problems when using online platforms and websites to self-regulate their writing both within and outside the classroom. L18, in this regard, pointed out the following:

> I felt using technology in writing skills took me longer than the traditional writing class, and many difficulties and problems appeared, making me disappointed and confused. I think I do not have enough confidence and proficiency. (L18, focus-group interview)

However, most participants mentioned an increase in their levels of proficiency and confidence and changes in their practical strategies or techniques used to develop self-regulation for writing skills (L15 & L11, focus-group interview). Table 28 shows the themes of the "improvement of technology autonomy" category.

Table 28

Improvement of Technology Autonomy

Categories	Themes	Examples
4. The improvement of technology autonomy	a. Positive attitude toward technology for writing learning	**L2:** *I gradually embraced more new technologies and more learning approaches for my learning, and then I broadened my horizons. Learning English has become more interesting now.*
	b. Increase in frequency of technology use for writing learning	**L4:** *I take higher frequencies in accessing the training online platform and recommended technological resources, actively using the support of technology to learn not only writing skills in*

	this course but also other language skills or other language courses.
c. Self-efficacy in technology use for writing learning	**L15:** *I started to add some English websites as my favorite Internet resources, read sample essays, and use online dictionaries and corpus-based learning as my favorite techniques to improve my writing.* **L11:** *I am becoming more passionate and proficient in using the support of technology in learning English because of its convenience and user-friendly learning space.*

Diverse and Personalized Learning Environment. The students shared that in previous writing courses, the learning resources and materials were mainly provided or assigned by their teachers through handouts or exercises in textbooks. Therefore, all the students normally were required to do the same exercises, assignments, or writing tasks even outside the classroom.

***Varied Authentic E-Resources and E-Channels*.** Concerning the "diverse and personalized learning environment" category, some participants addressed the variety of learning e-resources and e-channels, the extended efficiency of the training to other language skills, and the flexible learning space and time according to learning styles. For example, some of the interviewees shared that the varied authentic e-resources provided them with extended opportunities to practice and self-regulate their writing beyond the walls of the classroom, such as vocabulary self-expansion exercises, extended writing activities, and sample essays (L6, focus-group interview), compared to the limited paper-based writing exercises in their previous writing courses. Consequently, the rich online learning resources

and channels motivated and facilitated their language learning in the CALL environment (L15, focus-group interview).

***Integration of Writing Skills with Other Language Skills*.** Furthermore, according to some participants, the online learning channels (e.g., websites, learning applications, and platforms) were not merely beneficial only in the current writing course but also in other future language courses and other language skills. For example, some students explored that some websites and applications also offered various sessions for other language skills (L4, focus-group interview). They also mentioned that what they have completed in this self-regulated writing training course could be useful and beneficial in other aspects of their language learning (e.g., ideas for speaking skills and improvement of academic language structures and vocabulary) (L7 and 13, focus-group interview). Table 29 shows examples of the "varied authentic e-resources and e-channels" and "integration writing skill with other language skills" themes.

Table 29

Diverse and Personalized Learning Environment (Diverse Learning Environment)

Categories	Themes	Examples
5. Diverse learning environment	a. Varied authentic e-resources and e-channels	**L6:** *Through the training, I can practice my writing with the various online learning materials and learning tools through the lists suggested and uploaded by the teacher compared to the limited exercises in the textbooks or reference books. I learned a lot through the applications or websites for vocabulary self-study, and I collected many ideas, useful language structures, or phrases from the sample essays.*

	L15: *In Schoology, the teachers uploaded many online learning websites and tools. I can experience many of them, which makes my language learning more interesting and facilitate my learning in a CALL environment.*
b. Integration of writing skills with other language skills	**L4:** *After the course, I gradually get acquainted with a number of online learning websites or applications. Some of the websites also provide learning materials for other language skills.* **L7:** *After the course, I also use some applications in other language courses, such as Padlet or Popplet help me work in groups more effectively in other classes or synthesize many interesting ideas used for speaking skills as well.* **L13:** *Reading model essays and other peers' essays helped me extend my vocabulary size and academic language structures, which is useful for improving other language skills, especially in academic aspects.*

***Learning According to Learning Styles*.** Finally, some students shared that they attained greater learning commitment and engagement in writing activities outside the classroom due to the flexible learning space and time according to their preferred learning styles. The students could actively decide upon or structure the ways to practice writing skills according to their own preferences. For example, while some students prefer learning by visuals and often choose games or applications with colorful functions and layouts (L5, focus-group interview), others preferring reading can choose to collect ideas and language structures from model essays (L12, focus-group interview).

***Flexible Learning Space and Time*.** The participants also claimed that the training was a special learning experience; they were not limited by time and space. Accordingly, they could engage in writing activities, practice their writing, and communicate with their peers and instructors wherever and whenever convenient for them, and this increase their learning engagement in the writing activities (L3 and L1, focus-group interview). Table 30 shows

examples of the "learning according to learning styles" and "flexible learning space and time" themes.

Table 30

Diverse and Personalized Learning Environment (Personalized Learning Environment)

Categories	Themes	Examples
5. Diverse and personalized learning environment	c. Learning according to learning styles	**L5:** *I prefer learning through games and colorful functions, so I really enjoy using Popplet for idea brainstorming and a lot of games for vocabulary self-expansion.* **L12:** *I am good at reading skills. I often read the model essays through suggested websites. When I read the model essays, I often underline the good language structures and ideas and then draw a mind-map outline for my writing collection. Mind-map outlines are easier to remember.*
	d. Flexible learning space and time	**L3:** *It is more joyful when I can complete my writing online at home whenever I like. And I can download learning applications such as Duolingo, Padlet, etc., on my phone or tablet to learn whenever I like.* **L1:** *Thanks to e-learning platforms, I can communicate with my classmates and write in groups everywhere and whenever we prefer.*

***6.2.2. Negative Student Perceptions*.** In addition to the positive student perceptions, some of the participants had negative perceptions of technology-enhanced self-regulation training. Table 31 presents the categories and themes of the students' negative perceptions of the impact of the self-regulation training on their academic writing performance.

Table 31

Categories and Themes Addressing the EFL Students' Negative Attitudes Toward and Perceptions of Self-Regulation Training with Technology

Categories	Themes	Frequency	Percentage
1. Issues related to group work	a. Low participation & Minor contribution	15	40%
	b. Ineffective collaborative working strategies	10	27%
	c. Discouraged group members low self-confidence & unwilling participation)	12	33%
	Total	**37**	**100%**
2. Issues related to online learning devices	a. Insufficient & low-quality technological devices	15	37%
	b. Limited access	11	28%
	c. Inactive engagement	14	35%
	Total	**40**	**100%**
3. Issues related to activity design	a. Short duration	13	40%
	b. Poor connection to other language courses	9	27%
	c. Insignificant peer feedback	11	33%
	Total	**33**	**100%**

Issues Related to Group Work. As shown in Table 31, three categories along with nine themes are listed that address some of the students' negative attitudes toward the self-regulation training with technology. The first category illustrates the negative perceptions of participants toward the problems related to working in groups. Some participants, for instance, thought that the differences in levels of language proficiency caused low participation and minor contributions when working in groups. Although the students were allowed to form their own groups, sometimes not all members had the same levels of writing abilities. The students with high writing proficiency normally contributed most of the good

ideas, carried out most of the writing activities, and dominated the corrective feedback with high-quality comments. Therefore, less competent writers had fewer opportunities to engage in collaborative activities and improve their writing performance. For this reason, the low-ability students perceived working in groups as not very beneficial. L6, for example, stated the following:

> My group includes some outstanding students and some with weak writing performance. I am not good at writing. The group members with high language proficiency often contributed to error correction, editing, and idea creation. Therefore, I am not confident enough due to irrelevant ideas, inaccurate error corrections, or comments. (L6, focus-group interview)

The participants further asserted that some discouraged group members showed a lack of self-confidence and low commitment or willingness to participate in group work. This theme was explained by writing incompetency, inactive learning styles, and the conventional perceptions of teacher dependence. On one hand, L8 contended the following:

> I am the leader of my group. However, I tried my best to encourage the students who have minor contributions to share their ideas or comments in group work. They still ignore and are unwilling and unenthusiastic to participate in group outlines or other peers' writing texts. (L8, focus-group interview)

On the other hand, some less-proficient student writers mentioned that their feedback, editing, and revisions were neglected by their more able peers. This subsequently possibly reduced their writing self-confidence and negatively affected their contribution to the writing activities. L14 insisted the following:

> I prefer face-to-face and individual writing activities to online group interaction beyond the classroom. I am afraid that my ideas are ignored by the other peers, especially those with a high level of language proficiency. (L14, focus-group interview)

Issues Related to Online Learning Devices. Regarding "online learning device problems," five out of 20 (25%) participants reported that insufficient or low-quality technological learning devices and limited access to an internet connection or online learning platforms/applications resulted in some problems during the training course. They did not have well-equipped online learning tools, such as personal computers, stable internet connections, and adequate licenses to access some online learning platforms or applications. In addition, their skills and strategies for dealing with technical issues were limited. They faced many difficulties in navigating the sections or regulating their writing tasks in online learning platforms, especially without the teacher's instruction. Therefore, it slowed down their writing process. For example, L19 and L7 stated the following:

> My writing is not good. Now I have to get familiar with new steps or procedures and deal with many difficulties in online learning. This makes my writing slower and reduces my writing engagement. (L19, focus-group interview)

> Sometimes, the unstable internet connection and the limited access to free online learning platforms or applications decreased our level of motivation and engagement. (L7, focus-group interview)

Furthermore, a small number of participants highlighted a low level of engagement when participating in the self-regulation training course. They argued that the writing course should

be conducted individually and face-to-face under teacher supervision because they preferred teachers' assistance and regulation instead of technology assistance and self-regulation outside the classroom. Therefore, three students believed that the self-regulation training course supported with technology was not very interesting, nor was it effective, since their individual writing issues were not fully dealt with. L5 asserted the following:

> Practicing writing through an online learning space was challenging for me. Personally, I don't like writing my essay assignments, editing, and revising my peers' essays online due to slow typing speed and difficulties in using online tools or applications for peer feedback or self-revision. (L5, focus-group interview)

Issues Related to Activity Design. The next set of themes under the "training design issues" category addressed issues related to the writing activities of the training, such as short duration, poor connection to other language courses, and less helpful peer feedback. For instance, some participants reported that the duration of the training was too short for them to examine the effectiveness of the training or identify whether they improved their writing performance or self-regulation capacities. L3 mentioned that:

> The training ends too quickly, and I felt we must learn too heavy burden of knowledge or too many activities during the training. It makes me tired and stressed. (L3, focus-group interview)

The participants also mentioned a poor connection to other language courses in the same semester and in upcoming semesters. They expect to experience a similar learning system among four language skills in all four academic years at the university. L20 stated the following:

> We study some skills in blended learning and some other skills in face-to-face environments only. The differences in teaching approaches among the four language skills in different semesters make us confused and reduced the effectiveness of the training course. If we cannot continue such training course in future, I think this short-term training is not effective, and we will forget all that we have learned in this training. (L20, focus-group interview)

Finally, most of the interviewed participants (80%) positively perceived the effectiveness of peer feedback and their development of skills related to peer feedback activities, with 22 comments. However, four students (20%) held different opinions and indicated they evaluated highly individualized corrective feedback provided by the teacher but not the feedback from peers, with 11 comments. They argued that peer feedback in groups was less important and effective for improving their writing skills. In this regard, L10 and L16 stated the following:

> I usually feel more comfortable if I complete and revise my essay writing on my own. I did not feel comfortable editing my peers' essays as well. (L10, focus-group interview)

> In my previous conventional writing courses, I only received teacher editing. Although my teacher only gave comments on some essays, I felt that I could learn from his/her feedback. My peers often edit my essays, rewrite my sentences with wrong structures, wrongly spelling words, or misused collocations. Therefore, the peer feedback was not reliable. (L16, focus-group interview)

6.3. Chapter Summary

Regarding the self-regulated learning questionnaire, the paired sample t-test was performed to compare the pre- and post-questionnaire responses of the participants in the experimental group and then to identify whether there were any significant changes in the students' perceptions of their self-regulation capacities in writing skills after participating in the training. The findings showed significant differences in EFL learners' perceptions of their writing self-regulation in some specific constructs of the three main phases of the self-regulated learning approach. In the forethought phase, the participants positively perceived their changes in the capacities of goal setting and strategy planning, their self-efficacy beliefs for mobile learning and language learning, and their attitudes toward extrinsic motivation. In the performance phase, they significantly improved their confidence in applying appropriate task strategies for writing learning, seeking a suitable learning environment, self-rewarding, self-managing their emotions, and self-observing their writing progress. In the reflection phase, they significantly pointed to changes in their abilities to self-evaluate their writing progress.

Turning to the focus-group interviews, the qualitative results showed both positive and negative perceptions of the participants toward the influence of the self-regulation training on the EFL learners' academic writing competence and self-regulation capacities. As shown in Tables 19 and 31, there is a much larger proportion of participants' positive perceptions in the study than negative ones. First, the self-regulated writing training supported with technology was effective not only in mediating and developing the EFL students' writing performance but also in promoting their self-regulation in writing skills. The construction of writing self-regulation was expressed through the development of writing confidence, motivation,

individual writing strategies, and technology autonomy in the diverse and personalized learning space. However, some negative perceptions and challenges faced by some participants were also collected from the focus-group interviews. The most common categories were problems related to group work, the sufficiency and quality of online learning devices, and training activity design. Most participants who expressed negative attitudes were discouraged students, infrequent writers, or those with a low level of language proficiency or with a low level of technological skills. In the future, additional support could be delivered for these learners to facilitate their writing.

Overall, this chapter has presented the impact of the technology-enhanced self-regulation training on the EFL learners' self-regulation capacities in the essay-writing course. The qualitative findings of the present study indicated that the training potentially contributed to the perceptual changes of EFL learners toward the use of self-regulated learning strategies in their writing practice. The training also activated the other factors needed to self-regulate their writing (e.g., the development of writing confidence, motivation, individual writing strategies, and technology autonomy) with the support of a diverse and personalized learning environment within the CALL environment.

Chapter 7: Discussion

The results chapter reported the findings of the two main RQs from the perspective of the quantitative and qualitative data. This discussion chapter aims to provide an analysis and in-depth interpretation of the key results of the study. First, the technology-enhanced self-regulation training effectiveness on EFL learners' academic writing improvement is discussed. Subsequently, the perceptual changes toward self-regulated strategy use in writing skills according to the three phases of the self-regulated learning model and the self-perceived improvement of writing self-regulation capacities are explained in detail. In addition, the chapter aims to propose a possible effective technology-enhanced training program in writing self-regulation in Vietnam. Based on the discussion of the key findings, several pedagogical implications will be suggested at the end.

7.1. Summary of the Key Findings

The current study sought to explore the impact of technology-enhanced self-regulation training on EFL students' academic writing performance. In addition, the study aimed to explore the EFL students' attitudes toward and perceptions of the effectiveness of the training on the improvement of their self-regulation capacities in writing skills. The findings revealed that the self-regulation training with technology significantly increased EFL learners' writing performance in many aspects, including overall writing scores and the writing sub-scores of content, organization, vocabulary, grammar, and lexical richness. Furthermore, the data from the questionnaire and focus-group interviews highlighted the students' positive attitudes toward and perceptions of the technology-enhanced self-regulation training in writing skills and the positive influence it had on their academic writing skills and self-perceived self-

regulation capacities. The answers to each RQ are discussed based on the results considered above.

7.2. Technology-Enhanced Self-Regulation Training to Foster the Improvement of Academic Writing Performance

RQ1 explored whether technology-enhanced self-regulation training results in an improvement in learners' academic writing performance in terms of overall scores, five sub-scores of writing performance (e.g., content, organization, grammar, vocabulary, and mechanics), and lexical richness (e.g., lexical density, sophistication, and diversity) through the quantitative data collected from the pre-tests and post-tests. The quantitative data from the essay-writing pre-tests and post-tests show that the students significantly achieved an overall positive writing outcomes and improved writing performance in most writing aspects, including content, organization, vocabulary, grammar, and lexical richness.

These encouraging findings contribute to confirming the effectiveness of the key training model features (e.g., three main types of training supports and the continuous training in three cycles), the potential role of some sub-features of the training model (e.g., goal-setting strategies, explicit vocabulary/grammar learning training in L2 writing, the enhancement of global error correction, and self-regulated strategy training in technology use), as well as to providing EFL teachers or educators with some useful factors needed when designing self-regulation training (i.e., factors related to learners' psychology study preferences and length of training course), which is discussed in depth in the following sections. These findings also revealed that the training effects of the main study had been improved compared to those in the pilot study, in which only the participants' overall writing outcomes and some of the sub-

components of writing performance (e.g., organization, grammar, vocabulary, and lexical sophistication) were reported.

In the following sections, the EFL students' overall positive writing outcomes will be discussed in depth, followed by discussion on the improved writing skills in sub-components (e.g., vocabulary and grammar, content and organization) and less-improved writing skills in mechanics. The section will end with a summary of the main theoretical and practical contributions derived from the key findings of the study.

7.2.1. Overall Positive Writing Outcomes

After the treatment, the writing test scores of the experiment group were higher than the control group's scores. This finding revealed that students who received technology-enhanced self-regulation training achieved a better overall writing outcome than students who received the conventional writing course. It means that the students in the self-regulation training group were more capable of applying all or some of the training strategies to complete their writing tasks. Consequently, they became better at dealing with the writing tasks during and after the training course and then improving their positive achievements in academic writing. This positive finding has highlighted the positive impact of the key training model features (e.g., three main types of training supports and the continuous training in three cycles) on EFL students' improved overall writing performance, which is discussed in the following section.

The Role of the Three Main Types of Training Support, from the Forethought to Self-Reflection Phases. The continuous training supports, including affective, learning, and

collaborative learning supports, from the forethought to self-reflection phases, have contributed to the EFL learners' development of overall positive writing outcomes. First, in the forethought phase, the participants were convinced that they could write a high-quality essay if they developed self-regulated writing skills by planning well and seeking suitable learning strategies, which contributed to their increased confidence and motivation in essay writing. Second, in the performance phase, they were provided with several self-regulated learning strategies related to writing skills (pedagogical and strategic training) and techniques for using technology to improve their writing skills (technical and strategic training), including organizing the essay and developing ideas, managing the time allotted, structuring the environment, seeking social assistance, and revising and editing their essays with the support of technology. Third, in the self-reflection phase, the participants were encouraged to develop their collaborative skills and self-evaluate their learning progress through several extended practice activities inside and beyond the classroom. With these three abovementioned training supports, it may be considered that the students' overall writing skills might be gradually increased.

The Role of Continuous Training in Three Cycles During the Course. In addition to the three main types of training supports, the overall positive writing outcomes can be explained by the repeated or continuous training in cycles II and III. In this study, the self-regulated writing training was delivered to the participants in the experimental group from weeks 2 to 4 (i.e., cycle I), followed by repeated or continuous training in weeks 5 to 7 (i.e., cycle II), and weeks 9 to 11 (i.e., cycle III). In this way, three cycles of the self-regulation training model serve as continuous instructions in which the participants could review what they had been taught, troubleshoot any training difficulties and problems, improve their self-regulated strategies, and adapt the newly learned strategies to suit their own learning styles.

In terms of pedagogical purposes, students are more likely to increase their capacities to self-regulate their academic writing, and that improved strategy use would yield more motivation and interest in writing, consequently leading to a positive improvement in their writing outcomes. It can be concluded that the overall positive writing achievements in this study support the effectiveness of the three-cycle self-regulation training in enhancing EFL learners' academic writing performance.

It can be interpreted that the positive results in this study indicated that the main self-regulation training features, including three types of training supports, contributed to a more consistent result for students' writing improvement than the conventional writing course. In addition, the three-cycle self-regulation training also serves as a strength of the study compared to most of the previous studies, in which continuous or repeated training was absent (e.g., García Botero et al., 2021; Öztürk & Çakıroğlu, 2021; Raja et al., 2022; van Alten et al., 2020; Woottipong, 2022; Zhu et al., 2016). The repeated or continuous instructions are possibly assumed to suit the learning settings in which technology-enhanced self-regulated learning is a new experience, as in the Vietnamese EFL context. To examine the overall positive writing outcomes more clearly, it is necessary to analyze the improved writing skills in the writing sub-components, which are discussed in detail in the following sections.

7.2.2. Improved Writing Sub-Components

The results of the MANOVAs showed significant differences in most of the sub-components of writing performance (e.g., content, organization, vocabulary, and grammar) except for the mechanics component. These findings clearly show that the intervention used in this study

positively enhanced the students' improved writing skills in most of the writing aspects. The improved writing sub-components in vocabulary and grammar will be discussed first, followed by the improved writing sub-components in content and organization.

Improved Writing Skills in Vocabulary and Grammar Components. The experimental group displayed significantly higher improvement in vocabulary, lexical richness, and grammar components between the pre-tests and post-tests, with moderate to large effect sizes. It can be inferred that after the treatment, the experimental group was more capable of utilizing the training strategies to develop their vocabulary, lexical richness, and grammar.

Regarding the components of vocabulary and lexical richness, by contrast, Han et al.'s (2021) findings reported that technology-supported self-regulated learning did not significantly improve students' lexical accuracy and complexity. Several reasons can explain the differences between the current study and the study by Han et al. (2021), which are discussed in the next two sections.

Meeting Diverse Learners' Learning Styles and Personality Traits to Facilitate Vocabulary Learning in L2 Writing. First, the above differences can possibly be explained by the emphasis on diverse learners' learning styles and personality traits. In the current research, the vocabulary learning tasks were designed to meet the learning style diversity among students, which helps them learn according to their own styles and learning pace and then shape their personalized learning environment. On one hand, a wide range of technological learning tools classified according to difficulty levels was provided to suit various levels of students' language proficiency. On the other hand, the students' personality

traits were also considered when introducing technological advances in the training session due to the varied student perceptions toward the impacts of technology-enhanced self-regulated learning on their academic writing skills. For example, some participants preferred a game-based learning approach; they would extend their academic vocabulary through games, quizzes, and/or online learning tools (e.g., Duolingo/Quizlet/Kahoot!). Others preferred individual work and studying through reading; they tended to analyze the model essays and thereby learn academic words and useful language structures.

Therefore, it is crucial to examine elements related to students' psychological study preferences (e.g., environmental impact, study needs, and preferences) when organizing technology-supported self-regulated learning tasks.

Explicit Vocabulary/ Grammar Learning Training in L2 Writing. Second, such difference is possibly due to the training related to vocabulary/grammar learning. Regarding explicit vocabulary learning, the technical and strategic training in the ways to self-regulate vocabulary learning helps students to perceive vocabulary learning as a practical process (i.e., from discovering, obtaining, and mapping to consolidating new words) and then encourages them to acquire the targeted self-regulated learning strategies to increase their academic vocabulary. This might have enhanced the students' interest in and perceived value of vocabulary learning. The students in the experimental group also experienced a number of steps related to explicit grammar learning needed for L2 writing. As part of the self-regulation training, the instructor generated learners' initial motivation by emphasizing the value of grammar practice in L2 writing and the differences between formal and informal written language. After the awareness-raising step, the provision of self-regulated learning strategies allowed the participants to improve their grammar knowledge and skills more

effectively through peer and technology assistance, collaborative peer feedback, and teacher-designed or online-based grammatical exercises. These steps possibly increased the learners' self-confidence and competence in English essay writing in the area of grammar.

The improved writing skills in vocabulary, lexical richness, and grammar components supported that explicit vocabulary/grammar learning training likely results in a positive influence on the learners' improvement of academic writing performance and, consequently, should be included as a crucial component in self-regulation training.

This encouraging finding seems to consistently supports the argumentation put forth by scholars such as Engin & Donanci, 2016; Glaser & Brunstein, 2007; Göy, 2017; Öztürk & Çakıroğlu, 2021; Wu et al., 2017, who found that self-regulated writing training significantly contributed to students' increased writing outcomes in terms of vocabulary and grammar components. However, this study gained more positive results than the study by Göy (2017), which pointed out that the students still faced problems of sentence structuring and linguistic insufficiencies after the training. This difference could be explained by the small scale of Göy's (2017) action research and the relatively short training duration (i.e., three weeks) compared to this study (i.e., 15 weeks). This means that the length of the training, as one of the important factors, may also account for significant improvement in students' sub-components of writing performance.

In addition to the training length aspect, the improved writing skills in vocabulary and grammar might confirm the potential role of self-regulated strategy training in technology use in L2 writing, which is presented in the following section.

Self-Regulated Strategies Related to Technology Use for L2 Writing. The significant improvement in vocabulary and grammar with a large effect size has highlighted the positive impact of self-regulated strategy training related to technology use in L2 writing. Some previous studies have supported that technology innovations alone could not safeguard a successful learning process and outcomes (Han et al., 2021; Kennedy & Miceli, 2010; Oxford, 2009).

Therefore, it is important to enhance the self-regulated technology use for language learning through several training steps. During the training in the current research, the lecturer perceptually oriented and guided the EFL students to self-regulate their writing, especially in the stages of editing and revising their essays, by effectively making use of a wide range of technological learning resources (e.g., online text editing tools and online resources) so that they acknowledged the need for these self-regulated technology use skills and strategies and desired to study them to self-improve their vocabulary and grammar. When they themselves perceive the need to acquire these strategies, it serves as a link to apply these instructions to other efforts that improve the components of vocabulary and grammar.

The results of the interviews highlighted that the technical and strategic training in technology use for L2 writing promoted the students' improvement in the components of vocabulary and grammar. For example, one interviewee said that focusing and analyzing in depth how academic words and sentences are structured in model essays helped her write the essays more accurately, such as using proper linking words, grammar structures, and diverse formal lexical features in the academic context. Another student shared that critically using online text editing tools (e.g., Grammarly) allowed him to revise the essays more effectively with more accurate grammatical structures and linguistic features.

The findings indicated a positive relationship between the self-regulation training model and the students' improved writing skills in vocabulary, lexical richness, and grammar components. It is also argued that the improved writing skills in these aspects generally show positive effects of the training model by raising the necessity of self-regulated strategy training related to technology use and explicit vocabulary/grammar learning training, and meeting students' learning styles and personality traits to facilitate vocabulary learning in L2 writing. In this sense, it is recommended that language instructors should consider these important factors when designing technology-enhanced self-regulation training, which would increase the effectiveness of the training model.

Improved Writing Skills in Content and Organization Components. The participants in the training group demonstrated significantly greater improvement, with a large effect on the content component and a medium effect on the organization component. This finding affirmed that students who had self-regulation training were found to apply more self-regulated strategies to increase the quality of the content and organization of their essays. For example, they could make use of the available online learning resources, maintain their writing efforts, and seek social assistance from their peers to produce an essay with more well-organized structures and creative ideas.

This interesting result echoes what Göy (2017) found in her study, and the findings of Glaser and Brunstein (2007) also confirmed the effectiveness of self-regulated writing training in developing the sub-components of organization and content in writing skills. This consistency has strengthened the significant impact of the self-regulation training features (i.e., self-regulated strategy training in goal setting and the move from local to global error

correction) in this study on developing the content and organization components in L2 writing.

Self-Regulated Strategies Training Related to Goal Setting. First, the training strategies related to goal setting contribute to developing the content and organization components. Before the training, the participants noted that they often struggled with finding appropriate structures to develop their essays and relevant main ideas or supporting ideas for their essays, which sometimes resulted in out-of-topic problems in essay writing. During the training, the students were guided to identify the specific goals or requirements of the writing tasks before writing their essays, such as brainstorming essay structure and relevant ideas. With this support, the participants' writing performance regarding the components of content and organization possibly increased when they could "avoid going the wrong way when writing an essay" (L14, focus-group interviews) or "avoid going up a dead-end alley when writing" (L12, focus-group interview). Therefore, they are more likely to produce more well-organized essays, develop their essay with many different high-quality main ideas, and support them with strong and diverse supporting ideas, such as relevant explanations or examples.

The Move from Local to Global Error Correction. Second, the improved writing skills in the content and organization components are explained by the move from local to global error correction in writing after the training. Clearly perceiving and understanding the marking criteria of writing skills through affective support (i.e., general knowledge training), the participants gradually paid attention to all the sub-components of writing performance, called global error correction, when writing and revising their essays rather than spending most of the time on grammar- and vocabulary-related error correction, called local error

correction, as they did before the training. In other words, they could notice, mediate, and revise all the aspects of their writing work when peer-editing others' essays and self-editing their own essays. Consequently, they have moved from local (i.e., grammar, vocabulary) to global (i.e., content, organization) error correction by paying more attention to their error correction in all the sub-components of writing performance rather than in merely certain specific sub-components.

The above assumptions imply that self-regulated strategies related to goal setting and fostering balanced error correction in all writing aspects should be taken into consideration. In this sense, language teachers should take actions to guide or support learners in practicing the goal-setting process and changing their perceptions from local to global error correction; this would increase the quality of the essay content, and specifically organization, and then improve writing performance in general.

7.2.3. Less-Improved Writing Skills in Mechanics

No significant difference was found for the component of mechanics. However, the participants in both groups still achieved a slight improvement in mechanics.

The less-improved writing skills in mechanics can be explained by the relatively high baseline scores from the pre-tests. Although the training significantly affected the participants' academic writing sub-components and lexical richness, it was not very successful in improving their writing competence in the mechanics component (i.e., the rules related to punctuation, capitalization, and paragraph indentation) in the essay-writing tests. Our data align with the findings of MacArthur et al.'s (2015) study, which reported non-

significant effects of self-regulation strategy instruction on the component of mechanics in writing class. The key reason is that the means for the sub-score of mechanics in the pre-tests and post-tests were relatively high, (M = 9.35; 9.63 out of 10.0, respectively). The high baseline scores in the mechanics component suggest that the participants possibly had good prior knowledge of punctuation, capitalization, and paragraph indentation rules. According to their reflections after the training, the participants mentioned "the similarities in the rules of punctuation, capitalization, and paragraph indentation between English and their mother tongue" (L3, focus-group interview) and "not many differences in mechanics between formal and informal writing" (L18, focus-group interview) as two main benefits when they write English essays.

Based on the above discussion on the students' improved writing skills, some theoretical and practical contributions will be drawn and summarized in the following section.

7.2.4. Summary of the Discussion on Writing Performance

After the self-regulated writing instruction, the students in the experimental group, who had received three types of training support, had significantly better learning accomplishments in writing than the control group, who had not received such support. Regarding theoretical contributions, the positive findings in the current study highlight the benefits of the three main components of training support in promoting positive learning outcomes in EFL academic essay writing. In other words, the improved writing skills of the training group participants highlight the influence of self-regulation and mediation theories and the impact of the technology-enhanced self-regulation training model in the writing learning process and

further support the ongoing development of the self-regulated writing model in future research.

Regarding practical contributions, based on the findings of the study, language teachers are expected to raise their awareness of the connection between technology-enhanced self-regulation training and EFL learners' writing performance. They should also broaden their beliefs about and knowledge of the factors that affect learners' self-regulation skills and the strategies to enhance students' self-regulated learning in their language classrooms. For example, in addition to the main features of the training supports, some sub-features (e.g., self-regulated strategy training in technology use and explicit vocabulary/grammar learning training in L2 writing) or factors (e.g., meeting diverse learning styles and personality traits and fostering global error correction in L2 writing) should be involved in the self-regulated learning process to effectively develop the sub-components of writing skills (e.g., content, organization, vocabulary, grammar, and lexical richness). For example, the integration between self-regulated strategy training in goal setting, technology use, and explicit vocabulary/grammar learning training in L2 writing should be appropriately emphasized when designing self-regulation training. Meeting diverse learning styles and personality traits to facilitate vocabulary learning and fostering the move from local to global error correction in L2 writing should also be considered as important factors.

Finally, it is worth noting that a relatively long period of training as well as continuous training should be carefully considered in order to develop the students' writing skills. It means that language teachers are advised to carefully decide the length of the training course and the necessity for continuous training depending on the specific characteristics of learners and the language learning context.

7.3. Self-Regulation Training with Technology to Change Learners' Perceptions of Their Self-Regulated Strategy Use According to the Three Phases of the Self-Regulated Learning Model

The second purpose of the study was to investigate the students' perceptions of the impact of self-regulation training with technology on their writing self-regulation capacities through the self-regulated learning questionnaire (Ma, 2019).

The quantitative findings collected from the pre-questionnaire and post-questionnaire demonstrated significant perceptual changes in the participants' self-regulated strategy use in writing skills. The participants mainly changed their perceptions of their performance regarding extrinsic motivation, self-efficacy for language learning, self-efficacy for mobile learning, and learning goal and planning in the forethought phase; regarding learning environment management, self-rewarding, self-observation, emotion self-management, and task strategy seeking in the performance phase; and regarding self-evaluation in the self-reflection phase—with the effect size prioritized from highest to lowest. In addition, Cohen's effect size values ($d > 0.80$) suggested a large effect size in all constructs of the self-regulated learning questionnaire, showing a large effect of the technology-enhanced self-regulation training on students' perceptual changes toward self-regulated language learning in writing skills. Therefore, it can be concluded that the training has positively influenced the participants' perceptions of using self-regulated strategies for their writing learning.

In the following sections, the significant perceptual changes in the forethought phase (e.g., extrinsic motivation and self-efficacy for language learning and for mobile learning) will be discussed first, followed by the changes in the performance and self-reflection phases (e.g.,

good learning environment seeking, task strategy seeking, and self-evaluation). The section will end with a summary of the developmental tendency of EFL students' self-regulated strategy use in writing skills.

7.3.1. The Forethought Phase

Significant Perceptual Changes in the Forethought Phase. The participants expressed significant perceptual changes in extrinsic motivation and self-efficacy beliefs for mobile learning and for language learning in the forethought phase, with a large effect size.

***Extrinsic Motivation*.** The participants' responses from the self-regulated learning questionnaire reported the perceptual changes in extrinsic motivation with the highest effect size. Therefore, it can be inferred that the self-regulation instruction model may contribute to enhancing the students' perceptions of extrinsic motivation after the 15-week training intervention. First, a plausible explanation for this positive result is the well-prepared affective support or learning orientation, including general knowledge training related to writing strategies, together with self-regulatory strategies in writing skills in the forethought phase. This preparation helps students have greater confidence in and/or motivation for completing their writing work and more willingness to improve their academic writing outcomes. Second, the participants in the training group demonstrated increased extrinsic motivation likely because they were offered multiple writing opportunities and tools to flexibly practice their essay writing with the support of technology and varied learning environments (i.e., in-class and outside-class learning), and then they could meet their writing goals. This positive result is significant if we consider that low-performing student writers tend to be less confident and struggle with academic writing due to low levels of motivation

(Cox, 2009; Hidi & Boscolo, 2006; Schunk & Zimmerman, 2007). Therefore, the self-perceived enhancement in extrinsic motivation in the current study might significantly influence the learners' performance in their future writing courses and their academic progress.

Self-Efficacy Beliefs for Mobile Learning and Language Learning. Similar to the performance in extrinsic motivation, the quantitative data from the questionnaires also indicated a statistically significant increase in the capacities of self-efficacy beliefs for both mobile learning and language learning, which agrees with the finding of Yu's (2015) research. In the present study, the participants' self-efficacy beliefs for mobile learning and language learning were quite low, and they had low motivation to undergo the training before participating. They described that they were dependent learners, poor writers in academic writing, and not confident enough to use technology to practice and increase their writing performance during the course. After the writing self-regulation training, ranging from modeling, planning, scaffolding, and self-experiencing to self-reflecting, they became more confident in applying the knowledge and strategies they had been trained in and achieving their writing tasks rather than passively using translating tools for their essay writing as in the past.

Further Training in Enhancing Intrinsic Motivation. Unlike extrinsic motivation, the participants expressed insignificant improvement in their perceptions of intrinsic motivation after the training. This finding corresponds with the result of Yu's (2015) study, which indicated only a slight but statistically insignificant increase in intrinsic goal orientation. This implies that changing the students' perception of intrinsic motivation is more complex and challenging than their perception of extrinsic motivation. The students

may be more easily motivated and engaged by external factors, such as the scores, the completion of the subjects, and the contribution to their future study and career development. In addition, the self-regulation training activities might not be really successful in inspiring or enhancing students' learning motivation related to internal factors (e.g., learning academic writing is a challenge that I love to take.). In the self-regulated learning process, it is vital that learners derive satisfaction from their writing and foster an interest in the writing process, rather than merely focusing on scoring high marks. Consequently, perceptual changes aimed at enhancing intrinsic motivation may necessitate additional time, effort, or even ongoing training and practice to achieve substantial improvement in intrinsic motivation. Future training sessions should also prioritize generating meaningful perceptual changes in students' intrinsic motivation within the writing self-regulation process. This focus on intrinsic motivation will be crucial in fostering a genuine passion for writing and a more robust self-regulation process.

7.3.2. Performance Phase

Significant Perceptual Changes in the Performance Phase. After the writing self-regulation training, the students in the experimental group recognized a higher level of improvement in seeking a good learning environment, in seeking learning strategies to facilitate language learning tasks, in self-managing their emotions, and in applying self-rewarding and self-observation strategies for language learning in the performance phase. This positive pattern of results has added to the conclusions of the previous studies (Lin et al., 2017; Nguyen & Gu, 2013; Teng & Zhang, 2020; Woottipong, 2022) in which the integration of self-regulation training in composing activities significantly contributed to enhancing students' capacities to deploy self-regulated learning strategies, including metacognitive

strategies (e.g., writing monitoring), environmental strategies (i.e., peer discussion and help-seeking), and motivational regulation strategies (e.g., emotional control and interest enhancement).

Good Learning Environment Seeking. According to the results, the participants in the experimental group displayed significant self-reported improvement in seeking an appropriate learning environment from the pre-questionnaire to the post-questionnaire, with the highest effect size. It can be inferred that the participants were trained and then were more likely to build up a supportive and non-threatening learning space, effectively self-manage social relationships during the learning process, and take advantage of social scaffolding, if needed. A potential explanation for this result is the changes in the teaching approach, teachers' roles, and the assistance of technology during the training session. In the present research, the training was carried out based on a student-centered teaching approach, where teachers' roles were as facilitators, mentors, or advisors, which gives learners more freedom to process their own language learning. In addition, the use of technology for language learning extended the learning environment to be more personalized in the in-classroom study and after-classroom practice and/or to be more effective in both face-to-face discussions and in online discussions. Therefore, the trainees had more extended opportunities to practice and then were able to master the strategies related to self-organizing effective learning environments; self-managing the flows of group work or group discussion in both in-class and outside-class learning; and seeking social or physical assistance from teachers, peers, and/or technology more effectively.

***Task Strategy Seeking*.** In addition to the environment-seeking strategy, the results also reported significant perceptual changes in the performance for seeking learning strategies

to facilitate language learning tasks from the pre-questionnaire to the post-questionnaire. It can be argued that the trainees had better knowledge of or skill in seeking appropriate writing strategies to handle the writing tasks and tended to use them more effectively and frequently. A plausible explanation might be that the technology-enhanced self-regulation training encouraged the participants to achieve new writing knowledge and the targeted self-regulated learning strategies in writing skills with sufficient scaffolding from various channels (i.e., technology-based and social agent-based scaffolding) and peer collaboration.

Following the focus-group interviews, some participants mentioned changes in the use of self-regulated strategies in writing their academic essays from the pre-tests to the post-tests. For example, it was reported that in the pre-tests, they just quickly thought about the writing's topic (brainstormed), mainly focused on writing, and then conducted a quick check of their work for mistakes (self-evaluation). In the post-tests, students in the experimental group demonstrated the inclusion of more self-regulated strategies during their writing compared to the pre-tests. They described their writing procedure as being more complex with the shift to goal setting, idea and language brainstorming, strategic planning, writing, self-monitoring, and self-evaluating based on the detailed criteria checklist.

Due to the repeated practice of utilizing a wide range of task strategies to self-regulate their writing, the trainees first wrote their work with the support of the training and the instructors and then were able to memorize these strategies to complete their essay writing even when the visual support of the training instructions had faded. In other words, the self-regulation training might gradually stimulate students' awareness, promote their understanding, and encourage the students to deploy these self-regulated strategies for future learning.

Further Training in Practicing Time Management and Interest Maintenance Skills. Despite significant perceptual changes in the performance phase, the participants in the experimental group reflected little self-perceived performance growth in skills related to time management and interest maintenance. A possible explanation for the insignificant improvement in certain constructs of language learning strategies is the impact of learners' cultural beliefs regarding learning and the setting of the learning environment on their acceptability of language learning strategies (Chamot, 2004; Oxford & Burry-Stock, 1995; Wharton, 2000). The participants in the present research had been mainly educated through a lecture- and textbook-based learning methods, which focused on grammatical learning, error correction on language use accuracy, and standardized assessment. Therefore, one of the difficulties in teaching "learning to learn" is that modifying ineffective learning habits is challenging. The major solution is to practice self-regulated strategies such that they become automatic (Yu, 2015). Furthermore, the finding suggests that this sample of students required targeted instruction on how to develop their time management performance and how to maintain their learning interests. Due to the time constraints of the training, the self-regulation training session placed more emphasis on help-seeking, self-managing social group discussion, study environment management skills, and metacognitive strategies. In future trainings, the students should be offered more training time and practice opportunities to internalize the strategic skills related to time management and emotional self-management as effective study habits.

7.3.3. Self-Reflection Phase

Significant Perceptual Changes in Self-Reflection.

Self-Evaluation. The quantitative data from the self-regulated learning questionnaire reported a significant perceptual change in self-evaluation strategy in the self-reflection phase. This finding might be due to the supportive role of the essay checklist, expected assignment requirements, and specific assessment criteria presented in the pedagogical training as well as the suggested common errors and basic evaluation criteria in giving-feedback activities, as was found in the qualitative data collected. When they were trained to write, give feedback, and self-revise their essays according to the suggested areas of academic writing (e.g., thesis statement, organization, content, grammar, vocabulary, and mechanics) as a habit, they could change their perception toward the process of self-evaluation as the last step in the writing procedure. In the end, they could spend more time appropriately fixing writing errors related to lexical, grammatical, and mechanical accuracy and then making subsequent changes rather than conducting merely a quick check over their writing for spelling mistakes only. They also could effectively evaluate their writing progress based on a comparison of their writing performance among their essays against the specific available criteria.

According to previous studies, it is worth noting that the self-evaluation process is beneficial in increasing learners' engagement in their own learning (Nicol & Macfarlane-Dick, 2006; Panadero & Alonso-Tapia, 2013). It is explained that students' learning ownership or sense of responsibility will be increased by the fact that self-evaluation involves students in self-monitoring their learning process as well as facilitates self-reflection on their learning outcome during the self-evaluation process (Panadero et al., 2017).

7.3.4. The Developmental Tendency of Students' Self-Regulated Strategies in Writing Skills

What is promising is that the training course was more successful in increasing the participants' improvement in their self-regulated strategy use related to the performance stage, or the "during writing" stage. It could be seen that the participants, in general, reported stronger perceptual changes in the self-regulated strategies related to the "during writing" stage (e.g., task strategies, environment, self-rewarding, emotions, and self-observation) than in those related to the "before writing" (e.g., self-efficacy beliefs for mobile learning and extrinsic motivation) and "post-writing" (e.g., self-evaluation) stages. This means that the participants self-perceived higher frequencies in using "during writing" self-regulated strategies than "before writing" and "after writing" ones. This result is consistent with Asmari's (2013) study, in which the participants were found to employ more "during writing" strategies than "before writing" ones. The result of the current study also partially adds some support to Sung and Wang's (2020) study, which showed that learners showed infrequent performance of goal setting, planning strategies, and review of records strategies. These consistencies imply that changing learners' perceptions of the usage of self-regulated learning strategies related to the "before writing" and "after writing" stages is a challenging and long-term journey compared to perceptual changes in the "during writing" stage.

It was reported that the participants did not show any significant changes in the items of intrinsic motivation ($p = 0.06$), and future planning and evaluating the task strategies ($p = 0.05$ and 0.07, respectively). However, some previous studies have emphasized the correlated relationship between self-regulated strategies related to after-writing stages (i.e., task evaluation strategies and future planning) and students' writing performance (Asmari, 2013;

Roca de Larios et al., 2008; Sun & Wang, 2020). Therefore, more pedagogical instructions or practices should be carried out to encourage EFL learners to increase their confidence in self-regulatory strategies related to the "after-writing" stage in writing skills.

7.4. Self-Regulation Training with Technology to Change Learners' Perceptions of Their Writing Self-Regulation Improvement According to the Interview Data

In response to the second RQ, the findings also seemed to reveal that the self-regulated writing training supported with technology has affected students' self-regulation perceptions in a positive way based on the qualitative data collected from the focus-group interviews. The "improvement of individual writing" and "diverse and personalized learning environment" are the two largest categories with highest frequencies, followed by the categories of writing confidence development, writing motivation development, and technology autonomy improvement, respectively. The categories with low frequencies (e.g., writing confidence, motivation development, and technology autonomy improvement) are discussed first, followed by the two largest categories (e.g., the improvement of individual writing and the diverse and personalized learning environment). The improvement of writing responsibility as the largest theme is discussed to represent the improvement in the individual writing category.

Compared to the pilot study, the participants in the present study also initially expressed their active role in writing learning that is, acquiring an understanding of and strategies for planning their studying and activating their responsibility and technology autonomy as well as positively changing their perceptions of collaborative learning in the CALL environment (i.e., transferring from individual working to group working and from self-scaffolding to

collective scaffolding). The participants in the main study who received self-regulation training also highlighted the role of self-regulated writing training in developing their writing efficiency, self-evaluating their learning strategies and resources, and shaping their personalized learning environment.

7.4.1. Changes in Learners' Perceptions of the Role of Collaborative Learning in the CALL Environment

Improvement of Writing Confidence and Motivation by Supportive Collaboration, Group Engagement, and Multi-Directional Scaffolding. In the qualitative data collected from the focus-group interviews, the participants highlighted the positive experience of supportive collaboration, group engagement, and multi-directional scaffolding, as mentioned in the second category (Table 19). The training course not only helped the participants increase their motivation and engagement when completing writing activities, such as in the following statements: "motivates me [her] to share ideas more without the pressure of face-to-face communication" (L3, focus-group interview) and "the colorful and lively display functions attract me [him] to engage more" (L9, focus-group interview), but it also created a mutual learning space among learners, such as in the following statements: "identify inaccuracies in my [her] paper" (L19, focus-group interview), "look at what was good from my [her] peers and what I [she] need(s) to improve" (L10, focus-group interview), and "self-monitor my [his] thinking more carefully" (L8, focus-group interview). In line with the present study, Suwantarathip and Wichadee (2014) argued that supportive collaboration with technology in writing was indeed more convenient because it provided learners with a less-threatening and emotion-relaxed learning space without the restriction of time and space and the presence of the teacher or other classmates.

Additionally, the learners' engagement in group work, as mentioned in the second theme of the writing motivation development category in the current research, seemed to support the argumentation put forth by scholars such as Storch (2005), Hanjani and Li (2014), and Wigglesworth and Storch (2009), who have indicated that working together allowed students to produce written products of higher quality and then interactively and collaboratively improve their writing performance by identifying gaps in their language knowledge, deliberating about language, articulating their uncertainties, and offering suggestions and explanations through the process of developing a co-constructed text. As a result, many previous studies have concluded that learners working in groups could shape their confidence in writing, develop their critical thinking, promote their organizational skills, and shape their capacities to actively revise their writing (Aydin & Yildiz, 2014; Li & Kim, 2016).

In the current research, it was also found that the students appreciated the multi-directional scaffolding available through the online resources, their peers, and the teacher, as mentioned in the third theme of the writing motivation development category. One possible explanation for this finding might be the potential benefits of collaborative dialogue in language learning as scaffolding over traditional individual writing. Following Hanjani and Li's (2014) study, through social interactions, students supported and scaffolded each other through several functions, including advising (i.e., suggesting solutions to problems), instructing (i.e., teaching), and providing options (i.e., giving options to problems). In other words, in addition to the teachers' support as experts, students practiced their language learning by asking advice from their peers, clarifying uncertainties, and accepting accurate advice beyond the classroom. As a result, the dialogic interaction helped learners note their problem sources, give accurate solutions, pool or express their strengths of linguistic knowledge about the target language, and then improve their written texts.

Moreover, Lajoie (2005) reported that social interaction, including creating a good rapport with peers and sharing ideas together, brought learners great benefit regarding assignment completion. Therefore, the current research corroborates the results of Lajoie (2005) in that the participants raised their awareness of peer feedback activity as one useful type of support compared with teacher assistance or direct assistance in the face-to-face classroom during the training course. One possibility for this perception was attributed to the new information from the referenced resources and the high-performing peers' written products as a potential source of scaffolding or guidance in shaping their linguistic and content knowledge and completing the given assignments. Another possibility may be that the exchanges among peers encouraged students to reinforce their understanding of writing tasks and course content and develop their self-regulated writing strategies, which then led to a friendly, social, and supportive learning environment.

In line with the focus-group interview findings of the study, a number of participants indicated that they felt more motivated and engaged in writing activities when working with their outstanding peers. Following Vygotsky's (1978) social-constructivist theory, working in groups or collaborative writing activities allowed more capable student writers to use self-regulation writing strategies to mediate or scaffold their less capable peers. As a result, the less capable became more motivated and self-efficacious learners to engage in writing activities when collaborating with more capable peers to set writing goals, plan appropriate writing strategies, brainstorm and organize different ideas, and self-reflect on their writing work. It was argued by Aljaafreh and Lantolf (1994) that group work gradually supported the EFL learners to move from other-regulation to self-regulation in writing skills.

7.4.2. Changes in Learners' Study Behaviors in the CALL Environment

Improvement of Technology Autonomy. As indicated in the category of technology autonomy improvement, the participants positively changed their attitude toward technology use for writing. The learners' perceptions of the purpose of technology for language learning changed from being perceived as a channel for entertainment or for receptive skills to being viewed an effective learning tool for productive skills (i.e., writing skills). The participants selectively applied various technological tools to fulfill their learning purposes and regulate their writing process. Specifically, they appreciated the technology-enhanced self-regulation of language training as a platform for them not only to plan (i.e., online brainstorming in groups), evaluate, and monitor their essay-writing progress (i.e., online group peer-feedback and self-revising), but they were also encouraged to commit to the learning goal and seek opportunities for authentic language learning resources (i.e., extended writing activities, vocabulary extension activities through online tools and model essays). In line with the present study, Romeo and Hubbard's (2011) study found that the participants in a training course that targeted autonomous listening learning with technology gradually transformed from listening for entertainment to listening for learning. Similarly, Lai and Gu's (2011) study reported that language learners perceived the experience of self-regulated language learning with the support of technology in a positive way. Gao (2009), in a similar vein, indicated that language learning beyond the classroom provided students with a friendly and supportive community of practice and offered them an environment for self-expression and self-perception.

In addition, the qualitative results collected from the focus-group interviews showed an increased use of technology and enhanced self-efficacy in technology use for writing

learning. Students also expressed improved technical skills and increased commitment to technology use for other language skills in the future. This result supports previous studies' conclusions that self-regulation training not only boosted learners' computer literacy, learning confidence, and engagement (Barrette, 2001) but also promoted greater use of technological learning tools for language learning (Prichard, 2013; Reinhardt & Zander, 2011).

Improvement of Writing Responsibility as the Largest Theme of the Individual Writing Improvement Category. Following the first theme of the individual writing improvement category, self-regulated writing training supported with technology increased learners' individual writing responsibility with the highest frequency compared to other themes in the same category. This finding of the study is in relative harmony with that of Boykin et al. (2019), who showed a crucial role of technological tools along with self-regulated learning strategies in improving learners' writing capabilities. Similar to the findings of the present study, Su et al. (2018a) also highlighted the significance of online learning experiences in boosting EFL learners' self-regulatory skills. It was explained that the assistance of online learning tools as a supportive learning space allowed EFL learners to practice the self-regulation strategies in writing skills delivered in the training, such as setting goals, planning writing strategies, brainstorming and outlining ideas, self-managing, and self-evaluating their work to contribute to the development of their writing self-regulation. Furthermore, the flexibility and user-friendliness of online learning platforms supported the EFL learners to actively plan, manage, and self-regulate their own writing tasks, which could make them more confident and responsible for their writing and further increase their writing self-regulation to a greater extent.

In terms of the change from a passive to an active role of language learners, the finding of the study is in agreement with that of Alparda (2010), who found that although strategic training did not have any influence on students' attendance or the number of learning tasks completed in the classroom, the training with the assistance of technology possibly supported learners in developing their autonomy and shaping their awareness of learning styles and strategies. Similarly, much research has also pointed out that providing language learning strategies appropriately enabled students to benefit from the CALL tasks more effectively; for example, students took the initiative to explore the knowledge and strategies to actively solve problems (Holec, 2009, as cited in Benson, 2011), became more self-directed and more autonomous learners (Oxford, 1990), increased their motivation and sense of self-efficacy or self-confidence in their language capacities (Yin, 2008), took more responsibility in planning their own learning, and were able to select the relevant strategies to deal with a certain learning task (St Louis, 2007).

The positive changes in learners' study behaviors in the CALL environment could be explained by the fact that learners who received the self-regulation training were more active and more conscious of the advantages that language learning strategies provided and then tried to use them to tackle learning activities as much as possible. This change may also stem from the absence of the teachers when studying outside of the classroom and the change in the role of teachers from conductor to guide. Therefore, the explicit instruction in language learning strategies, on one hand, created many challenges; on the other hand, it provided learners with many opportunities to increase their level of autonomy and self-regulation capacities, and accordingly, they were more conscious and active in their language learning process.

In line with the focus-group interview results of the research, some learners shared that they could develop their self-revision, self-improvement, and self-evaluation in their writing skills. The training was designed based on integrating collaborative and individual writing tasks in the blended learning environment. This integration allowed the EFL learners to accomplish the writing activities more effectively, which subsequently developed not only their writing competence but also foster the move from other-regulation to self-regulation in their writing. Vygotskian's (1986) social-constructivist theory explained that learners' performance happens "first, on the social level, and later, on the individual level" (p. 57). In other words, learners' performance should first occur among members in groups, considered as other-regulation, and then take place within each individual member, considered self-regulation. During the writing course in this study, the EFL learners' writing self-regulation first emerged and increased when the learners regulated each other's writing performance through students' writing mediations in a number of collaborative writing activities (e.g., brainstorming and peer-feedback activities in groups). After that, their writing self-regulation continually developed when they self-regulated their writing performance through individual writing activities (e.g., drafting and self-revision).

Shaping Learners' Diverse and Personalized Learning Environment. The data collected from the focus-group interviews showed the role of self-regulated writing training supported by technology in shaping learners' diverse and personalized learning environment, as the fifth category presented in Table 19. Following Ma (2017), mobile technologies supported learners in extending their learning tools and ways of communicating with other social agents through various channels. This finding also aligns with Ma's study (2017), in which mobile learning helped learners develop their ability to generate personalized learning spaces mediated by mobile technology.

Firstly, in terms of diverse learning environments, the participants had more opportunities to experience a wide range of authentic learning materials and resources through various means, including emails, Dropbox, Google Docs, etc. In the traditional classroom, the students interacted directly with other social agents, such as teachers, peers, and friends, who provided learning resources, scaffolding, and assistance for their learning. However, when mobile technologies were integrated into language learning, the students could increase their learning tools, learning resources, and communication with other agents. For example, an instructor could upload learning materials online, and the students could download and store them on their laptops or mobile devices (e.g., Chen & Chang, 2011; Chen & Chung, 2008; Stockwell, 2007). In addition, an instructor could deliver his/her assistance or scaffolding to students via mobile learning devices, and students could interact with or scaffold other classmates even beyond the wall of the classroom (e.g., Cheng, 2010; Lee, 2008).

On one hand, mobile technologies served as an important storage tool for learning resources downloaded from online platforms and mobile devices. On the other hand, mobile technologies as learning applications or lexical tools played a significant role in mediating, assisting, and scaffolding the students' learning process. With access to the Internet, the learning resources and materials stored in mobile devices could be constantly renewed and updated daily. Therefore, language learning was not bound by time and space but rather flexibly moved from formal to informal learning (Ma, 2017).

Secondly, regarding personalized learning environments, the students could generate their own personalized learning space with the assistance of technology. Along a similar line, Ma (2017) highlighted the role of mobile technology mediation in supporting learners to shape

their personalized learning contexts. In addition, it was proposed that learners actively participated in "shaping their own forms of individualized generation of contexts for learning" (Pachler et al., 2010, p. 23) and creatively applied "different activities with personal objectives and meanings" when dealing with the same learning task (Yahima, 2013, p. 4). For example, in the current study, both Oyla and Archie really engaged in online idea brainstorming, but Oyla preferred using Popplet with a mind-map outline, whereas Archie chose the Padlet application for his essay outline by listing or using bullet points. While Tina increased her academic vocabulary by reading model essays, Justin was interested in learning by games or online applications.

Following Ma's (2017) study, there were several factors influencing personalized language learning with the support of technology, including learners' motivation, beliefs, study discipline, learning styles and strategies, and personal interests. These factors contributed to shaping and structuring the students' personalized learning contexts. Therefore, the assistance of technology was viewed as a mediator or a catalyst to help each student further form their personal learning agency and their own distinctive attributes. As a result, it is recommended that the language instructors and educators should pay more attention to these factors in designing learning activities to help learners form their distinctive personalized learning environment.

7.5. A Possible Effective Technology-Enhanced Training in Writing Self-Regulation in Vietnam

The research framework is inspired by the three-phase cyclic model of the self-regulated learning approach (Zimmerman, 2000) and the socio-cultural framework for mobile

technology-mediated L2 learning (Ma, 2017), which adds to the existing evidence that can be used to build an effective training program on self-regulation in academic writing skills in Vietnamese EFL classrooms.

Similar to the framework presented in Figure 3 in the literature review chapter, the technology-enhanced self-regulated writing training consists of three kinds of support (i.e., affective, learning, and collaborative learning supports) according to three phases of self-regulated learning (i.e., forethought, performance, and self-reflection) in a blended language classroom (i.e., face-to-face and online learning). In addition, the training emphasizes the development from other-regulation from social agents (e.g., friends, parents) and technology to self-regulation. In the Vietnamese context, EFL learners are in the early stage of a new learning environment (i.e., blended learning) with low levels of technological skills and motivation for using technology for productive language skills. Therefore, the localized technology-enhanced self-regulated writing training framework should be adapted to deal with these characteristics. The localized training framework should (1) *reach a reasonable balance between in-class and out-of-class learning* (i.e., devoting more time to in-class learning and then gradually reducing the in-class time based on the improvement of the learners), (2) *provide sufficient and appropriate support*, and (3) *provide multi-directional scaffolding to foster the move from other-regulation to self-regulation*.

7.5.1. Reaching a Reasonable Balance Between In-Class and Out-of-Class Learning

The current research shows that the writing learning process took place under teachers' guidance and the integration between in-class and out-of-class learning. The self-regulated writing training was also designed to align with the topics of the program's curriculum and

the in-class learning. On one hand, beyond-classroom learning provides learners extended learning opportunities, solves problems related to time and space barriers, and reduces learners' anxiety. Only a small number of writing tasks could be completed inside the classroom due to time and space limitations; therefore, some extended learning activities (i.e., vocabulary extension activities, online peer feedback, and revising activities) were created to allow students to further practice and develop their writing skills beyond the walls of the classroom. For example, the diversity of vocabulary extension activities outside the classroom through game-based activities, online learning applications, and/or model essays contributes to meeting the diversity of learning styles and strategies in writing classrooms with many students. Taking peer feedback as another example, when the learners could generate online peer feedback at home, they felt emotionally relaxed due to the absence of the teacher and other classmates. They could also edit their classmates' essays at their own speed and think more critically about what sentences and/or paragraphs to edit and how to edit without being restricted by time and space. In addition, the students could edit, modify, and delete the content, the organization, and the linguistic features of their peers' essays more easily.

On the other hand, voluntary online training can face problems related to trainees' level of involvement or engagement with the training content due to the minimal teacher support and the level of responsibility the learners must take on. It might be true that the learning process increasingly occurs outside of formal learning contexts and in unstructured learning environments (Bjork et al., 2013). However, it has been reported that students' engagement in formal and outside-the-classroom or unsupervised learning led to positive learning accomplishments in language learning (Inozu et al., 2010). Previous research has also indicated that a maximal language learning effect was a consequence of the integration

between formal and informal learning in diverse and unsupervised learning contexts (Kukulska-Hulme, 2012; Sung et al., 2015). Furthermore, some previous studies have reported that trainees' engagement in voluntary online training is usually lower than in compulsory online training (Kasprisin et al., 2003) and that voluntary online training programs normally lead to the phenomenon of "the rich get richer" (Kulik et al., 2007). Therefore, the blended learning approach could be considered as a more effective learning space in which sufficient teacher scaffolding and learner mental preparation are warranted as well as where the connection between other-regulation by other social agents and self-regulation by the trainees themselves is balanced.

7.5.2. Providing Sufficient and Appropriate Support (Affective/Learning/Collaborative Learning Supports)

The training in writing self-regulation should be designed as a seamless integration of affective and learning support in the formal classroom environment with the collaborative learning support in the informal technology-mediated classroom. In the focus-group interviews, it was reported that most participants evaluated themselves as independent or passive EFL learners before the training although they perceived the significant role of learning autonomy in language learning. Other frequent comments from the participants related to the low level of active involvement in extended learning activities outside of the classroom and the low level of confidence in using technology for language learning. Furthermore, some participants also complained about the imbalance between the heavy load of learning content or knowledge required and the limited in-class time.

Therefore, the training framework tries to link the three types of support (affective, learning, and collaborative learning supports) to the students' compulsory writing course. Some participants described their learning procedure as moving from (1) the period of perceptual changes and (2) first-time experience to (3) real-life application in the micro-community of practice after the training. Our focus-group interview data revealed that some participants gradually recognized the prominent role of self-regulation and technology assistance in language learning, the stages of writing self-regulation, and essay-writing practice. However, they admitted that "it's hard to change in action totally, we [they] gradually change in our [their] mind" (L9, focus-group interview).

Following the motivational preparation through general knowledge training, learning support provides learners with essential pedagogical knowledge, relevant learning strategies, and guidance on technology use in writing skills. Under the sufficient provision of learning support, one participant described the training as a "supportive and positive learning environment" (L14, focus-group interview) and a "first-time experience" (L13, focus-group interview), which encouraged her to freely try new learning experiences, such as new online tools, new language learning games for writing skills, and to write according to the logical steps and relevant strategies in each writing step.

Finally, collaborative learning support built up through the link between in-class (vocabulary games in groups, group brainstorming) and out-of-class (group online peer feedback and discussion) learning allows learners to practice relevant strategies of the training further and to express their learning autonomy by solving problems in their own learning community. One student viewed collaborative learning as a bridge between inside-class and outside-of-class learning and as a micro-community which "help me [her] reflect on my [her] language

learning process and then apply what I [she] have learned for what I should do in the real-life situations outside the classroom" (L17, focus-group interview). For example, learning autonomy was illustrated by the fact that they applied the essay-writing checklist when they wrote an essay; and that they actively produced peer feedback and collaboratively scaffolded to tackle writing tasks in groups and recycled online learning tools used in class to group work outside the classroom.

7.5.3. Providing Sufficient Multi-Directional Scaffolding Fosters the Move from Other-Regulation to Self-Regulation

The self-regulated writing training should provide learners with scaffolding from many different social agents. It can be argued that teachers' role has changed from instructors to facilitators and that teacher-directed learning should be changed to autonomous learning. However, EFL students who are even categorized as "digital residents of the young generation" still need teachers' support to help social communication outside the classroom move forward and to help them link supervised and unsupervised learning environments. For example, some infrequent writers suggested that teachers' assistance is essential to "break down the iceberg when we [they] work in a group or give some guiding questions when no one in the group has ideas" (L19, focus-group interview). Moreover, teacher support was likened to navigators for those experiencing difficulties in technological aspects and as a double-check-feedback giver for those who still highly appreciate the feedback or comments from teachers to complement the drawbacks of peer feedback. Therefore, on one hand, teachers should flexibly take on many different roles in blended learning to guarantee the effective learning outcomes and the progress of the students.

On the other hand, students also should be trained to transform their roles as learners in a technological-mediated space from passive learners to decision-makers because they often work with their peers in a collaborative environment. Following Vygotsky's (1978) social-constructivist theory, the EFL students collaboratively shared ideas, addressed writing issues, and constructed knowledge to succeed in completing joint learning activities (e.g., brainstorming, vocabulary games, teacher-feedback and peer-feedback activities in groups), in which together they could thus improve their writing performance. After collaboratively working in groups, the participants were provided opportunities to individually work on their essays and then gradually move from other-regulation to writing self-regulation (e.g., first draft, self-revision, and submission activities). In doing so, the students reduced their reliance on others' mediation and achieved more independence in their writing and writing self-regulation. Gradually, they have more motivation and engagement in their writing and tend to implement this learning style in the other writing courses in the future.

It can be found that the learners' writing capabilities are developed when they are provided with and receive the amalgam of effective mediations or multi-directional scaffolding from various social agents and learning tools (e.g., peers, teachers, technology, and self-regulation training). Therefore, multi-directional scaffolding or assistance from the other social agents is also needed to facilitate EFL students' self-regulated language learning process in addition to affective, learning, and collaborative learning supports.

7.6. Pedagogical Implications

Previous studies have indicated a positive relationship between language learning perceptions and self-regulated learner training (García Botero et al., 2021; Lai & Gu, 2011; Lai et al.,

2016a; Lai et al., 2016b; Öztürk, & Çakiroglu, 2021; Su et al., 2018a, 2018b; Sun & Wang, 2020; Zhu et al., 2016). Therefore, several pedagogical implications can be drawn and recommended for educators, EFL instructors, and curriculum designers based on the findings of the study.

7.6.1. Enhancing Self-Regulation Training Beyond the Classroom

Although this study investigated only the self-perceptual changes of the participants toward the use of self-regulatory strategies in writing skills, it showed that the learners had a positive learning experience and acknowledged the usefulness of self-regulation training in promoting their English academic writing learning. However, the participants in this study sometimes encountered challenges or undesirable learning experiences (e.g., overwhelming or unreachable learning goals, irrelevant writing strategies, and difficulties in identifying learning strengths and weaknesses and/or seeking solutions to tackle writing weaknesses). To help students address these difficulties, two pedagogical implications are recommended. Firstly, despite their positive understanding of the role of goal setting and learning self-evaluation in writing skills, the students managed only to change their perceptions as the changes in action require more effort and time. This implies that EFL instructors and curriculum designers are advised to pay more attention to training their learners to achieve adequate self-regulated learning strategies related to goal setting and self-evaluating their language learning through various writing tasks as well as to provide learners with extended opportunities to practice their goal setting and self-evaluation skills in writing work beyond the classroom. Accordingly, EFL teachers and educators should provide both procedural and multi-directional scaffolding to enhance EFL learners' self-regulatory goal setting and increase their possibility of writing task completion and the quality of their academic essays.

The second implication is that teachers are encouraged to devote more time and efforts to students who have difficulties evaluating their learning through numerous strategies, including self-assessment questionnaires and focus group interviews, to enhance learner engagement in new learning environments. Due to the restricted time in the language classrooms, it is suggested that self-regulation training be carried out not only in a formal learning environment but also further take place beyond the face-to-face classroom with the support of technology.

Moreover, the results of the study indicated that self-regulation in academic writing is a trainable student characteristic (Cleary & Zimmerman, 2004) and that self-regulation training can be applied successfully in EFL language classrooms. From a pedagogical perspective, teachers or educators should encourage learners to change their learning process from teacher-directed to self-regulated learning. The process of change starts with students' observation and reflection on effective learning strategies, followed by determining what needs to be changed and learning how to change. In other words, the writing self-regulation strategies could be improved firstly through modeling interventions (Schunk & Zimmerman, 2007). Observing a potentially successful model not only helps EFL learners increase their motivation for writing but also supports them in the internalization and adaption of the writing strategies. Teachers' social assistance or scaffolding is also important in developing self-regulated learning. Teachers should introduce useful self-regulatory strategies through explicit description, modeling, and illustration to enhance the self-regulatory development of students more effectively (Graham & Harris, 1989; Sawyer et al., 1992). It is also necessary for language instructors to offer learners ample opportunities outside the classroom to rehearse the strategies they have learned. This could help learners move from the observational stage to the self-regulated stage (Sun & Wang, 2020). Finally, similar

facilitation methods can be employed by learning tools and software developers to build technology-based collaborative learning environments that support and enhance students' self-regulation capacities in such learning contexts.

7.6.2. Structuring Effective Collaboration

The study's results highlighted the potential impact of group discussion and collective scaffolding on learners' writing performance. However, learners sometimes did not engage in extended group discussion, and they preferred to work individually or with only some group mates, leaving out others. This leads to inadequate collaboration in CALL environments. To maximize the learning potential of collaboration in writing practice, students must be aware of the factors involved in working in groups. For example, they must clearly understand (1) the stated objectives of the learning activities and the collaboration in these activities, (2) the learning benefits they can gain when they work together, (3) how to effectively check other's performance and deliver relevant feedback (i.e., peer-feedback checklist or guidelines via guiding questions), and (4) the importance of accepting collective ownership when working together.

In addition, effective collaboration should be encouraged if the writing tasks can (1) allow discouraged students to actively make their own decisions about when and how to join in the discussion, (2) allow less competent or low-performing student writers to access and learn from their higher-level peers' writing work, (3) provide supportive and constructive rather than critical feedback from peers and teachers especially in the early stages in CALL contexts, (4) enhance interaction among learners in both social and academic purposes, including peer regulation, group regulation to build an enjoyable online learning

environments in group work or collaborative tasks (Zhang et al., 2022), and (5) leave adequate time to create the necessary willingness and confidence for developing effective collaboration. Collaborative learning can be reinforced when students as decision-makers can express their learning identity and agency through (1) freely choosing their preferred topics and (2) autonomously determining the roles and responsibilities they want in their community of practice. These can lead students to become autonomous learners.

7.6.3. Maximizing the Benefits of Peer-Editing

It was implied from the findings that sharing and peer-editing writing papers in technology-enhanced collaborative learning environments helped EFL learners develop their academic writing performance more effectively both inside and outside of the classroom. However, EFL learners sometimes felt uncomfortable when sharing their own writing work as well as felt unconfident when editing and correcting their peers' essays. Therefore, it behooves EFL instructors and educators to emphasize to the students how effectively and efficiently the activities of peer-editing can improve their academic writing performance and then engage them in such learning contexts. Especially for those with lower-level English language proficiency, EFL teachers and educators should acknowledge various online applications as one of the newly emerging and potential collaborative learning tools that facilitate academic writing skills since learners can have sufficient time and space to think more critically and deeply about the different components of academic writing. To maximize learners' engagement in peer-editing, EFL teachers and educators should (1) allow learners to easily access and correct a peer's essay by changing the font color, producing interactive feedback, as well as receiving and responding to the peer feedback; (2) guide learners to make comments based on the five sub-scores of academic writing (content, organization, grammar,

vocabulary, and punctuation); and (3) check each peer's contribution to each writing activity and give comments on it to make peer-editing an equal contribution among learners.

7.6.4. Enhancing Diverse and Personalized Learning Approaches to Language Learning

The research findings revealed the significance of self-regulated writing training in creating a rich and personalized language learning experience with the support of technology. According to Ma's (2017) study, one important component of each MALL course design was the personalized element. When designing technology-enhanced courses, personalized elements should be appropriately integrated into informal learning or outside-of-class learning through individual homework or group projects. Teachers can identify each student's attributes and then assign the students in pairs or in groups. In this way, students can work collaboratively and cooperatively more effectively, and teachers can support each individual student with more personalized assistance.

Each student, as an individual social agent, not only shared a number of common attributes in their L2 agency but also processed their own personalized traits, learning beliefs, preferred technological learning channels for their language learning, different learning motivations, and different learning disciplines or habits. These distinctive attributes shaped the students' personalized approaches to language learning in the CALL environment. In addition, such a personalized language learning approach not only formed students' identities but was also considered as a "group repertoire that can be shared, exchanged and reflected upon among a community of learners" (Ma, 2017, p. 199).

Therefore, teachers should design regular learning group discussion activities or sharing activities in both formal learning (i.e., traditional face-to-face meetings in class) and informal learning (i.e., online learning platforms, social networking sites) to enhance and facilitate such sharing and the exchange of personalized learning strategies or learning resources, especially among students with different study habits/practice. Because of the increasing development of technology, learners should be encouraged to reflect on the effectiveness of their own online learning resources/learning technological tools; to learn from their peers; to be more willing to step out of their comfort zone; and then to explore and experience some new learning strategies and online learning technologies or channels. Such sharing and exchange also enhance the dynamics of the whole learning community and increase the learners' self-reflective, self-regulatory capacities to tackle CALL activities more effectively (Ma, 2017).

7.6.5. Enhancing the Practice of "Before-Writing" and "Post-Writing" Self-Regulated Strategy Use

The quantitative findings highlighted stronger changes related to the "during writing" stage (e.g., task strategies, environment, self-rewarding, emotions, and self-observation) than to the "before writing" (e.g., self-efficacy beliefs for mobile learning and extrinsic motivation) and "post writing" (e.g., self-evaluation) stages.

However, Roca de Larios et al. (2008) highlighted the correlated association between the application of evaluation and revision strategies and students' writing performance. This means that those who devoted more time to planning and revising than on formulating their writing were normally high-achieving students. Following Sun and Wang (2020), learners

who frequently carried out reviewing and revising and sought more writing practice opportunities would have higher writing proficiency. It was also stated in a previous study that "before writing" and "after writing" strategies (e.g., review and evaluation strategies) contribute more to students' writing proficiency even though EFL students tended to adopt "during writing" strategies more frequently (Asmari, 2013).

Therefore, teachers are advised to encourage EFL students to practice more "before writing" and "post writing" strategies. It was reported that participants did not show much change in the items of intrinsic motivation (before writing), evaluating the task strategies, and future planning (after writing). More pedagogical activities should be created to allow students fully understand the importance of the self-regulated learning process in writing skills and increase their engagement in using self-regulated strategies related to the "before-writing" and "post-writing" stages. In addition, EFL students should be encouraged to increase their intrinsic motivation and to evaluate the learning strategies they have experienced.

7.6.6. Providing Continuous Explicit Instruction or Extensive Practice After the Training

Although the technology-enhanced self-regulation training successfully achieved its goal in academic growth, the results indicated only a moderate effect size in terms of overall scores and a moderate-to-high effect size in terms of the sub-scores of writing performance. Therefore, it is advised that continuous training and scaffolding continue to be provided after the training because learners can improve their language proficiency and self-regulation capacities as well as their increased engagement and self-regulated strategy use in writing skills. It is assumed that learners' engagement in writing will increase when they obtain higher writing scores.

To sustain the strong effects on EFL learners' writing development, it is suggested that teachers should include an extended stage of explicit training in future writing interventions and offer continuous practice of the key self-regulation tasks outside the classroom. This pedagogical suggestion is expected to suit Vietnamese ELF learner writers with low levels of language learning motivation and self-regulation capacities in writing skills. Furthermore, extensive long-term practice and feedback remain significant for learners after the training, especially for struggling or weaker writers. In this way, learners can automatically and successfully generalize and internalize effective learning strategies into their future writing process. Finally, instructors or teachers are recommended to monitor learners' self-regulated learning strategies regularly to encourage them to modify and improve these newly learned strategies continuously for their own future learning experience as well as organize discussions or tutorials in which learners can exchange their successful learning experiences as well as difficulties while self-regulating their writing. As a result, they not only adopt new effective self-regulatory strategies from their peers but also find solutions to adjust their own strategies.

7.6.7. Providing Additional Support or Assistance for Discouraged Students, Weak Writers, and Those with a Low Level of Language Proficiency or Low Level of Technological Skills

The findings indicated that the common characteristics of learners who had negative attitudes to the training were students who were discouraged, infrequent writers, or who had a low level of language proficiency or a low level of technological skills. It might be true that a self-regulated learning approach in the online settings promotes autonomous learning. Some EFL learners, however, still need assistance from their teachers or instructors to help them link their structured and unstructured learning spaces and familiarize themselves with the new

learning space. Therefore, teachers should profile the students with more detailed information, especially less competent writers, low-writing-ability students, or discouraged group members. As a result, teachers could provide additional assistance in both face-to-face writing classes and online learning platforms to boost their learning motivation and engagement. Teachers also should emphasize learner-initiated and learner-directed learning experiences and listen to the learners' voices to "understand and interpret learner practices and to plan educational interventions" (Kukulska-Hulme, 2012, p. 8). In addition, teachers are advised to analyze in depth the habitual learning routes of these kinds of students and then combine learning with their favored channels, technologies, learning styles, and topics or themes. Such additional assistance or analysis could create a friendly and supportive learning space, which increases learners' willingness and/or commitment to participate in group activities or online learning tasks.

7.7. Chapter Summary

This discussion chapter has discussed the understanding and interpretation of the study's key findings and provided the necessary argumentation and explanation to investigate the results from multiple perspectives. In terms of the first RQ, the participants' improvement in writing competence (e.g., overall scores, five sub-scores of writing performance, and lexical richness) collected from the essay-writing tests indicated the significant contribution of self-regulation training to the students' overall positive writing outcomes and improved writing skills in various writing components (e.g., content, vocabulary, grammar, organization, and lexical richness).

Turning to the second RQ, the participants reported significant perceptual changes in their self-regulation strategy use in writing skills. They significantly changed their perceptions of the self-regulated learning strategy related to the "during writing" stage (i.e., performance phase) compared to the "before writing" and "after writing" stages (i.e., forethought and self-reflection phases, respectively). On the contrary, they did not show much confidence in some important components of self-regulated learning, such as intrinsic motivation, strategy evaluation, and future planning. Therefore, some pedagogical recommendations have been drawn to tackle this issue. In addition, the participants indicated their perceptual changes in terms of the role of collaborative learning and study behaviors in the CALL environment. Specifically, self-regulation training with technology helps them improve their writing confidence and motivation through a supportive, collaborative learning environment, group work engagement, and multi-directional scaffolding from other social agents. The training also increases the students' technology autonomy and writing responsibility and allows the students to shape their diverse and personalized learning environments.

Based on the positive influence of the training on students' writing competence and self-regulated strategy use, three main factors—flexibly extending learning environments from in-class to outside-class, providing sufficient support or scaffolding according to relevant writing stages, and promoting the move from other-regulation to writing self-regulation—have been discussed to build a potentially effective self-regulation training in academic writing skills. According to the discussion on the key findings of the study, several pedagogical implications have been put forth to enhance the effectiveness of the training as well as to address the drawbacks of the current study.

Chapter 8: Conclusion

The study is motivated by the fact that although self-regulated learning plays a prominent role in the language learning process, many EFL learners fail to develop an adequate self-regulation capacity to fully benefit from the diverse online learning materials. Accordingly, this research aims to build a training model to enhance learners' self-regulation capacities for language learning in a blended academic writing course. The present study probed into how technology-enhanced self-regulation training influences learners' academic writing performance and facilitates learners' developmental process in self-regulation capacities.

To facilitate EFL students' self-regulated learning capacities in academic writing, a technology-enhanced self-regulation training model in L2 writing is developed and validated in this study, which allows university students to improve their academic writing competence and self-regulated writing strategies. The self-regulation training model is inspired by Zimmerman's three-phase cyclic model for self-regulated learning (Zimmerman, 2000) and embraces Ma's (2017) socio-cultural framework for mobile technology-mediated L2 learning. The model is constructed to capture the three key components of support related to writing self-regulation capacities and to describe the nature of the self-regulation process from other-regulation to self-regulation levels, involving (1) affective support, (2) learning support, and (3) collaborative learning support. While the general knowledge training related to language learning is provided in affective support, the training of writing skills and community-building development are respectively delivered through the learning support and collaborative learning support components. The writing skill training session is carried out through three-part training, including pedagogical, strategic, and technical training.

An intervention study of 78 students majoring in English in their junior year in a state university in Vietnam was carried out to implement this technology-enhanced self-regulation training model and evaluate its effectiveness. The students in the training group were asked to acquire and practice several learning strategies and/or methods to self-regulate or self-manage their own academic writing learning through three cycles of training over 15 weeks.

8.1. Summary of the Major Findings

The current study explored the potential role of technology-enhanced self-regulation training in improving EFL learners' academic writing skills and self-regulated writing capacities to complement in-class language learning. With the support of the quantitative and qualitative data, it is evident that the self-regulation training model implemented in this study positively affects students' improved writing performance and gradually fosters positive perceptual changes in their use of self-regulated strategies for practicing academic writing. To this end, the answers to the two RQs are summarized below.

In response to the first RQ, the quantitative results indicated that the technology-enhanced self-regulation training program was effective in improving EFL learners' writing performance. This positive result confirms the significant relationship between the self-regulation training intervention and the EFL learners' academic writing competence. This result suggests that by applying this technology-enhanced self-regulation training model to writing classrooms, EFL students have the potential to develop their overall positive writing outcomes and develop their writing skills in most of the sub-components, including content, organization, vocabulary, grammar, and lexical richness.

In response to the second RQ, the training model has contributed to the participants' perceptual changes in their self-regulation capacities in writing skills. Firstly, the self-regulation training supported with technology has led to the students' self-perceived changes in many constructs of the three main phases of the self-regulated learning approach (i.e., forethought, performance, and self-reflection phases). It was reported that the participants tended to be more frequent and confident in using the self-regulated strategies related to the phases of forethought (before-writing stage) and performance (during-writing stage) than those in the phase of self-reflection (post-writing stage). In addition, the training successfully changed learners' perceptions of the role of collaborative learning and their study behaviors in the CALL environment. Regarding the perceptual changes in the role of collaborative learning, the students first expressed a development of writing confidence and motivation by supportive collaboration, group engagement, and multi-directional scaffolding. Regarding the study behavior changes, they also acknowledged a self-perceived improvement in individual writing strategies and technology autonomy. Finally, the training effectively and efficiently built a diverse, personalized learning environment. These findings of the study also serve as meaningful evidence for the effects of the treatment on nurturing Vietnamese learners' use of self-regulated learning strategies to regulate or manage their own writing processes.

However, three main negative perceptions of the effectiveness of the self-regulation training on the students' academic writing competence emerged when promoting technology-enhanced self-regulated writing training in Vietnamese language classrooms. Some participants shared that they mainly faced issues related to online learning devices, followed by group work and activity design issues. Based on most participants' positive and negative perceptions, several pedagogical implications were recommended for EFL teachers, language educators, and curriculum designers. Language educators and curriculum designers are

advised to provide further self-regulatory strategies training beyond the classroom to create more learning opportunities for effective interaction and collaboration in language classrooms. EFL teachers are encouraged to maximize the benefits of peer-editing activities to enhance diverse and personalized learning approaches to language learning; to promote the practice of "before-writing" and "post-writing" self-regulated strategy use; to provide continuous explicit or extensive practice after the training; and to provide additional support for discouraged students, infrequent writers, and those with a low level of language proficiency or low level of technological skills.

Based on the key findings, a possible localized technology-enhanced self-regulated writing training program suitable for the Vietnamese learning context has been proposed and discussed. It has been suggested that the localized training program should include at least three core factors, namely, (1) reaching a reasonable balance between in-class and out-of-class learning, (2) providing sufficient and appropriate learning support, and (3) providing multi-directional scaffolding to foster the move from other-regulation to self-regulation.

8.2. Contributions

The present research contributes to self-regulation training in academic writing skills with the support of technology in language classrooms. Regarding theoretical contributions, a clear picture of technology-enhanced self-regulation training in L2 academic writing is also presented in this research. The positive results of the research contribute to highlighting the impact of the key training model features (i.e., three components of training support) on increasing students' writing performance and raising the necessity of certain factors when designing self-regulated writing tasks (i.e., self-regulated strategy training in goal setting and

technology use, explicit vocabulary learning training, meeting diverse learning styles and personality traits to facilitate vocabulary learning in L2 writing). In addition, the other factors related to training duration and continuous instruction should be considered with reference to the specific learners' characteristics and language learning context.

Another theoretical contribution is that the study's results shed light on the mediating role of self-regulated writing training in Vietnamese EFL contexts and have the potential to inform further research and teaching practice related to self-regulated writing training in technology-supported language learning. Therefore, the study enriches the research on technology-enhanced self-regulation training in L2 academic writing and has provided practical implications for both EFL students and teachers. By showing that technology-enhanced self-regulation training positively influences the development of EFL students' writing performance and self-regulation capacities, specific instructional methods or teaching approaches can be applied to enhance writing proficiency and self-regulation. EFL students in higher education are encouraged to become more aware of self-regulation's and technology support's roles in their language learning process. Meanwhile, English teachers should apply the appropriate pedagogical strategies suggested in the study to the Vietnamese students to develop their English academic writing proficiency and writing self-regulation capacities.

In terms of practical contribution, self-regulated writing training in this study has been used with second-year university students, which can be generalized to other populations and settings. The results of this research are highly encouraging and may inform self-regulated writing training for EFL students not only in Vietnam but elsewhere in the world. Hopefully, the technology-enhanced self-regulation training used in this research can serve the larger

community of English language learning at higher education levels in Vietnam and other regions/countries by helping students achieve greater competence in English academic writing and writing self-regulation.

Regarding the research design, the first strength of this study is the use of a mixed methods design, combining quantitative and qualitative methods and a quasi-experimental study to investigate the impact of technology-enhanced self-regulation training in developing EFL students' academic writing competence and self-regulated writing capacities. The writing self-regulation training examined the improvement of learners' writing performance and self-regulatory capacities in an authentic context during a semester-long course (i.e., 15 weeks), where learners practiced their essay writing compared to the shorter training durations of most previous studies (i.e., approximately a one-month or two-month period) (e.g., Alparda, 2010; Glaser & Brunstein, 2007; Göy, 2017; Raja et al., 2022).

8.3. Limitations of the Study

The research has revealed some results highlighting the effectiveness of self-regulation training in developing EFL learners' academic writing competence and increasing their writing self-regulation capacities. However, several limitations need to be kept in mind when interpreting the present research's findings. The limitations include (1) the use of self-report measures and (2) a small sample size.

The first limitation is that the participants' development of self-regulated learning capacities was analysed based on self-report methods (questionnaires and interviews). Although the data collection instruments exhibit appropriate levels of reliability and validity, the researcher still

encountered difficulties in examining how truthfully the students answered the questions when using self-report measures.

As the second limitation of the study, the self-regulated learning questionnaire was administered to only the experimental group. In this study, the pre- and post-questionnaires collected from the experimental group demonstrated significant perceptual changes toward learners' self-regulated strategy use in writing. If the data collected from self-regulated learning questionnaire were also collected from the control groups, more meaningful evidence could be obtained to show the impact of self-regulated writing training. Therefore, in future research, students in both experimental and control groups should complete the survey on self-regulated learning questionnaire.

The third limitation of this study is the small sample size. Due to some practical constraints, only 78 second-year university participants took part in the research. This number constitutes a relatively low sample size for a mix-methods study and limits the finding's validity. Therefore, future studies with larger sample sizes may help validate the results of this research. Future research should investigate the efficacy of such training model through exploratory and quasi-experimental studies on larger scales involving larger samples of students and different levels of students (e.g., freshman university students or high school students). In addition, the current research was conducted only in Thua Thien Hue province, Vietnam. Although great preparation was taken in designing the study, additional studies in other parts of Vietnam are required to verify the validity of the results. Significantly, the results of this study should be further examined in other cities and regions given the existence of widely acknowledged regional differences in the country.

8.4. Recommendations for Further Research

Based on the pedagogical implications mentioned in the discussion chapter, some recommendations for further research are discussed in detail in this section, and these should be rigorously examined when the self-regulation training program is implemented next. It is suggested that self-regulated writing interventions should emphasize the benefits of training outside the classroom, effective collaboration, peer-editing, diverse and personalized learning approaches, the balanced development of self-regulated strategies during writing stages, and the sufficient provision of continuous explicit instruction and additional assistance for weak writers after the training. Some directions are provided for future research below.

First, research on learner training in self-regulated strategies is called for to further explore the benefits of self-regulation training supported with technology on productive skills and the integration of the four language skills. These research topics have so far received inadequate attention in the aspect of learner training in self-regulation in language learning. Because self-regulation training is needed in language learning, much research should be carried out to investigate the role of self-regulation training on EFL learners' language performance in other learning spaces (e.g., flipped, blended, and online language learning), especially on productive skills.

Second, this study explored the impact of self-regulation training with technology in improving EFL learners' academic writing performance from the combined use of essay-writing tests, self-regulated learning questionnaires, and face-to-face focus-group interviews in a mixed-methods design. Therefore, future research may benefit from using these tools to explore the self-regulation capacities of EFL learners with the support of learner training.

However, future studies should include various data collection instruments, such as classroom observations, teachers' evaluations, students' writing analyses, and students' reflection journals. These instruments can further evaluate how effective technology-enhanced self-regulation training is in language learning.

Third, more research is needed to analyze the conditions in which learning environments and levels of learner willingness and language proficiencies voluntary online learning programs can lead to substantial learning improvement. Although voluntary online language courses might face challenges of minimal teacher guidance and the required learner responsibility, they are expected to be more flexible and beneficial if learners acquire sufficient skills for self-study in an autonomous language learning environment and are confident enough to self-regulate their learning process.

Fourth, the current research's findings support that intermediate and advanced EFL students likely benefit from technology-enhanced self-regulation training in writing skills. However, this research has not investigated the impact of the training model in starter or elementary levels of language proficiency, which can be explored in future research.

Finally, only 78 EFL students participated in the study for 15 weeks (one academic semester). In future research, the sample size and training duration should be increased to better analyze the efficacy of such training model in EFL students' language learning. Because self-regulation is considered a characteristic of life-long learning, the participants' language proficiency should be continually evaluated even after the training to explore further the influence of the training model's long-term effects (i.e., after one more semester or one academic year).

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APPENDICES

Appendix A- Ethical Review Form

香港教育大學
The Education University of Hong Kong

27 December 2019

Ms Thi Thanh Thao TRAN
Research Postgraduate Programmes
Graduate School

Dear Ms Tran,

Application for Ethical Review <Ref. no. 2019-2020-0068>

I am pleased to inform you that approval has been given by the Human Research Ethics Committee (HREC) for your research project:

Project title: A Self-regulated Training Model Mediated by Blended Writing Course: The Dynamics of Learner Training

Ethical approval is granted for the project period from 6 January 2020 to 31 August 2021. If a project extension is applied for lasting more than 3 months, HREC should be contacted with information regarding the nature of and the reason for the extension. If any substantial changes have been made to the project, a new HREC application will be required.

Please note that you are responsible for informing the HREC in advance of any proposed substantive changes to the research proposal or procedures which may affect the validity of this ethical approval. You will receive separate notification should a fresh approval be required.

Thank you for your kind attention and we wish you well with your research.

Yours sincerely,

[redacted]

Patsy Chung (Ms)
Secretary
Human Research Ethics Committee

c.c. Professor CHOU Kee Lee, Chairperson, Human Research Ethics Committee

香港新界大埔露屏路十號
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Appendix B - Consent Form

THE EDUCATION UNIVERSITY OF HONG KONG

Department of Linguistics and Modern Languages

CONSENT TO PARTICIPATE IN RESEARCH

Exploration of a Technology-Enhanced Self-Regulation Training Model for Enhancing Students' Academic Writing Skills in the Vietnamese Tertiary Context

I, TRAN Thi Thanh Thao, hereby consent to participate in the captioned research supervised by Dr. MA Qing and conducted by TRAN Thi Thanh Thao, who are staff/ student of Department of Linguistics and Modern Languages in The Education University of Hong Kong.

I understand that information obtained from this research may be used in future research and may be published. However, my right to privacy will be retained, i.e., my personal details will not be revealed.

The procedure as set out in the **attached** information sheet has been fully explained. I understand the benefits and risks involved. My participation in the project is voluntary.

I acknowledge that I have the right to question any part of the procedure and can withdraw at any time without negative consequences.

Name of participant _____

Signature of participant _____

Date

Appendix C – Information sheet

INFORMATION SHEET

Exploration of a Technology-Enhanced Self-Regulation Training Model for Enhancing Students' Academic Writing Skills in the Vietnamese Tertiary Context

You are invited to participate in a project supervised by Dr. MA Qing and conducted by TRAN Thi Thanh Thao, who are staff/ student of the Department of Linguistics and Modern Languages in The Education University of Hong Kong.

The introduction of the research

A) What does the research involve?

The study aims to examine how learner training improves learners' writing performance, and to understand how learner training facilitates learners' development process in self-regulated capacities.

B) Why were you chosen for this research?

The research outcomes are expected to design a self-regulation training framework in which learners can participate more in active and collaborative learning environment to facilitate self-regulated competence, and then to analyze how the training course improves learners' writing performance as well as to explore how learners develop their self-regulation skill during the training.

The methodology of the research

A) Describe how many participants you will include in this study

The intended participants of the researh are 60 EFL second-year students in the Department of English of University of Foreign Languages, Hue University in Vietnam. The participants are from 19 to 21 years of ages. I will meet the participants in person in class, and ask them their personal contact information, and then send them the invitation to take part in the research. After the training, the researcher send the participants the invitation to attend the face-to-face focus-group interviews. About 18-20 participants will be chosen for focus-group interviews.

B) Procedure of the research

78 EFL second-year students take part in the 2-hour writing training course during 15 weeks via blended learning environment. During the training, all participants are asked to do a timed pre-essay, post-test and delayed post-essay writing test in week 1, 8 and 15 respectively in 60 minutes. After the training, 18-20 out of EFL students will participate in an in-depth face-to-face focus-

group interviews with the researcher. The focus-group interviews will last approximately 60-90 minutes and will be recorded. The interview venue will be arranged at your convenience.

C) Potential benefits (including compensation for participation)

The participants can engage in active and collaborative training platform in which they practice, improve their writing performance, and develop their self-regulation capacities under the assistance of technology. At the end of the research procedure, I will email the participants a summary of my research findings. If they wish, a complete written version of the study can also be sent to them via e-mail or postage.

The potential risks of the research

There are no foreseeable physical or psychological risks beyond the risks of everyday life for you if you participate in the research project.

Your participation in the project is voluntary. You have every right to withdraw from the study at any time without negative consequences. All information related to you will remain confidential, and will be identifiable by codes known only to the researcher.

How results will be potentially disseminated

Your privacy will be maintained strictly. I am going to make a list of all participants and give each of you a pseudonym. The data and participants' names will be stored in a computer hard-drive whose password is known to the researcher only. The hard copies of the completed questionnaires and interview tapes as well as interview transcriptions will be kept in a locked cabinet. The results of the study will be only disseminated in PhD thesis for Education University of Hong Kong, and the conference presentation.

If you would like to obtain more information about this study, please contact TRAN Thi Thanh Thao at telephone number [redacted] or their supervisor Dr MA Qing at telephone number [redacted].

If you have any concerns about the conduct of this research study, please do not hesitate to contact the Human Research Ethics Committee by email at hrec@eduhk.hk or by mail to Research and Development Office, The Education University of Hong Kong.

Thank you for your interest in participating in this study.

TRAN Thi Thanh Thao

Principal Investigator

Appendix D - Pre-tests and Post-tests

WRITING TRAINING SESSION- 2020

WRITING TRAINING SESSION

PRE-TEST WRITING

Name: _____

You should spend about 60 minutes on this task

Write an essay about the following topic:

Some people stated that social media increases communication and makes connections with people all over the world. However, some people argued that it damages our personal relationships. What is your opinion?

Give reasons for your answer and include any relevant examples from our own knowledge or experience.

Write at least 250 words.

Write your essay here!

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WRITING TRAINING SESSION

POST-TEST WRITING

Name: _____

You should spend about 60 minutes on this task

Write an essay about the following topic:

There have been many advances in technology over the past fifty year. These have revolutionised the way we communicate with people who are far away. What is your opinion?.

Give reasons for your answer and include any relevant examples from our own knowledge or experience.

Write at least 250 words.

Write your essay here!

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Appendix E – Essay Marking Sheet

Essay Marking Sheet (Hsu & Lo, 2018; Shehadeh, 2011)

ESSAY MARKING SHEET

Student: Student ID:

Mark	Level	Description	Feedback
CONTENT	9-10	**EXCELLENT TO VERY GOOD:** well-developed topic – clear & focused topic sentences – strong & convincing supporting details – good summary of the main points	
	6-8	**GOOD TO AVERAGE:** adequately developed topic – occasional minor problems with depth of development and unity – mostly strong and convincing supporting details – appropriate summary of the main points	
	3-5	**FAIR TO POOR:** somehow developed topic – not appropriate topic sentences or not evident controlling ideas - some irrelevant, vague, and insufficient supporting ideas – somewhat adequate summary of the main points	
	0-2	**VERY POOR:** inadequately developed topic – no clear central theme – difficicult to rate topic sentences – many irrelevant, vague and insufficient supporting ideas – inadequate summary of the main points	
ORGANIZATION	9-10	**EXCELLENT TO VERY GOOD:** information is - logically organized information – effectively sequenced with effective use of transitions	
	6-8	**GOOD TO AVERAGE:** Information is – mostly organized – sequenced with mostly effective uses of transitions	
	3-5	**FAIR TO POOR:** Information is – loosely organized and consequence – several problems with cohesion, sequencing, and flow of ideas – sometimes unclear relationship between ideas	
	0-2	**VERY POOR:** obvious lack of organization – often unclear relationship between ideas – difficult to flow	
VOCABULARY	9-10	**EXCELLENT TO VERY GOOD:** sophisticated range – range of word/idiom – mastery of word form	
	6-8	**GOOD TO AVERAGE:** adequate range – occasional mistakes of word/idiom, *but meaning not influenced*	
	3-5	**FAIR TO POOR:** limited range – frequent mistakes of word/ idiom– *meaning influenced*	
	0-2	**VERY POOR:** essentially translation – little knowledge of English lexical items, idioms, word form	
GRAMMAR	9-10	**EXCELLENT TO VERY GOOD:** effective complex constructions – few mistakes of agreement, tense, number, word order/ function, articles, pronouns, prepositions	
	6-8	**GOOD TO AVERAGE:** effective but simple constructions – minor mistakes in complex constructions – several mistakes of agreement, tense, number, word order/function, articles, pronouns, prepositions *but meaning seldom influenced*	
	3-5	**FAIR TO POOR:** major difficulties in simple/complex constructions – frequent mistakes of negation, agreement, tense, number, word order/function, articles, pronouns, prepositions and/or fragments, run-ons, deletions – *meaning influenced*	
	0-2	**VERY POOR:** virtually no mastery of sentence construction rules – dominated by errors – does not communicate	
MECHANICS	9-10	**EXCELLENT TO VERY GOOD:** demonstrates mastery of conventions of spelling, punctuation, capitalization, paragraph indentation	
	6-8	**GOOD TO AVERAGE:** occasional mistakes of spelling, punctuation, capitalization, paragraphing indentation *but meaning not influenced*	
	3-5	**FAIR TO POOR:** frequent mistakes of spelling, punctuation, capitalization, paragraphing errors – meaning is disrupted	
	0-2	**VERY POOR:** no mastery of conventions due to the frequency of mechanical errors – dominated by errors of spelling, punctuation, capitalization, paragraphing – handwriting illegible	

Appendix F – Guidelines for individual writing activity

GUIDELINE FOR INDIVIDUAL WRITING ACTIVITY

(1) BRAINSTORMING (Ideas/ Structure/ Language Use)

In this task, you are required to use one of the learning apps (Popplet/ Padlet) to brainstorm your ideas, your useful topic vocabulary for your own essay. Five popplets are already created by the teachers and shared with all of you.

TOPIC 1: FILMS

TOPIC 2: PROTECT COUNTRYSIDE

TOPIC 3: TECHNOLOGY IN MODERN EDUCATION

TOPIC 4: INTERNET AND HUMAN COMMUNICATION

TOPIC 5: JOB SATISFICATION

You are required to:

STEP 1: Assess popplet.com and leave your IDEAS, TOPIC VOCABULARY in each topic (as many topics as possible). Now we have GROUP OUTLINE.

STEP 2: Use the GROUP OUTLINE to make your OWN INDIVIDUAL OUTLINE on which topic you want to write the essay.

STEP 3: According to INDIVIDUAL OUTLINE, identify the general direction of your essay, as well as the main idea of each paragraph. Try to think of what academic related-topic vocabulary, academic sentence structures should be used in your essay.

(2) FIRST DRAFT

In this task, you are required to write your **ESSAY (FIRST VERSION)** *based on the* **INDIVIDUAL OUTLINE**. *You have to:*

STEP 1: Use the individual outline; write the complete essay in 250 words

STEP 2: Use learning apps (e., Grammarly/ online dictionairies/ corpus-based platforms) to review your first version essay

STEP 3: Review your first version essay according to the following criteria before sharing with the other peers and instructor

When you write, pay attention to:

-"Word Limit" (250 words)

- "The essay organization/ Structure" (4-5 paragraphs)

- "Cohesive devices/ transitions" (Linking words)

- "Thesis statement (Introduction)/ Topic sentences (Body)/ Supporting details (Body)/ Conclusion"

- "A range of topic related vocabulary/ Correctness of grammar/ A variety of sentence structures"

Use the checklist below before submitting your first version essay

3. REVISING- PEER/ INSTRUCTOR FEEDBACK

In this task, you are required to share your FIRST VERSION ESSAY with your peers/ your instructor for their feedback. You have to:

STEP 1: Share your first version essay via Zoho Docs/ Google Docs with all the other participants in our group, and the instructor.

STEP 2: Give feedback on at least four essays of your peers according to the guideline attached below

Some errors are suggested:

1. Word choice

2. Sentence structures

3. Grammar

4. Spelling errors

5. Punctuation errors

Some basic criteria should be focused:

1. Grammar & Vocabulary: "Use a range of topic related vocabulary; check correctness of grammar (i.e., subject-verb agreement, number, verb tenses, etc.); use a variety of sentence structures."

2. Thesis statement: Only one thesis statement/ Right position in specific topic of the essay

3. Content: "Well developed/ Clear/ focused/ convincing details/ no irrelevant supports/ good summary of the main points."

4. Organization: "Logically organized/ effectively sequenced with effective use of transitions; use cohesive devices (transitions) to present a logical progression of ideas; check the development of the topic."

5. Mechanics: "Spelling, punctuation, capitalization, paragraph indentation"

(4) EDITING/ FINAL SUBMISSION

STEP 1: Read through the first version essay and edit it based on the peer-/instructor feedback or the following points:

- ✓ "Word choice"
- ✓ "Sentence structure"
- ✓ "Grammar"
- ✓ "Spelling errors"
- ✓ "Punctuation problems"

STEP 2: "Confirm the completion of your essay and submit it".

Appendix G – Questionnaire of self-regulated language learning

QUESTIONNAIRE OF SELF-REGULATED LANGUAGE LEARNING

Please fill the following questionnaire regarding how you are learning/ using English writing on which you spend most time. Please choose one number that truly reflect your real situation:
1=strongly disagree, 2=disagree, 3=slightly disagree, 4=partly agree, 5=agree, and 6=strongly agree.

1. Forethought Phase

Learning goal & planning	**Strongly disagree**	**Disagree**	**Slightly disagree**	**Partly agree**	**Agree**	**Strongly agree**
I have clear goals for my writing learning.	1	2	3	4	5	6
I make a step-by-step plan to achieve my writing learning goals.	1	2	3	4	5	6
I set up weekly/ monthly tasks for my writing learning.	1	2	3	4	5	6
I will persist until till I reach the goals I make for myself.	1	2	3	4	5	6

Self-efficacy beliefs for mobile learning	**Strongly disagree**	**Disagree**	**Slightly disagree**	**Partly agree**	**Agree**	**Strongly agree**
I have the necessary skills for mobile learning.	1	2	3	4	5	6
I am a skillful user of software or apps on mobile devices.	1	2	3	4	5	6
I have confidence in complementally using online technologies and mobile devices for mobile learning.	1	2	3	4	5	6
I understand well the terms related to online technologies and mobile devices for mobile learning.	1	2	3	4	5	6

Self-efficacy beliefs for language learning	**Strongly disagree**	**Disagree**	**Slightly disagree**	**Partly agree**	**Agree**	**Strongly agree**
I believe that I will achieve all my goals for writing learning.	1	2	3	4	5	6
I'm confident that I have good writing skills to achieve my goals.	1	2	3	4	5	6
I'm certain I can handle well those writing tasks I set up.	1	2	3	4	5	6

Intrinsic motivation	**Strongly disagree**	**Disagree**	**Slightly disagree**	**Partly agree**	**Agree**	**Strongly agree**
I think it is very interesting to learn academic writing.	1	2	3	4	5	6
Learning academic writing makes me feel satisfied.	1	2	3	4	5	6
Learning academic writing is a challenge that I love to take.	1	2	3	4	5	6

Extrinsic motivation	Strongly disagree	Disagree	Slightly disagree	Partly agree	Agree	Strongly agree
I learn and practice academic writing because it helps me to gain more knowledge related to my subject learning.	1	2	3	4	5	6
I learn and practice academic writingbecause it is required for my course study.	1	2	3	4	5	6
I learn and practice academic writing as it is helpful for my future study or career development.	1	2	3	4	5	6

2. Performance Phase

Task strategies	Strongly disagree	Disagree	Slightly disagree	Partly agree	Agree	Strongly agree
I know what techniques/strategies I should use to facilitate my writing tasks.	1	2	3	4	5	6
I know how to make use of learning materials I've got.	1	2	3	4	5	6
I rehearse writing materials/items regularly in order to keep them in my memory.	1	2	3	4	5	6
I prioritize my writing tasks and pay close attention to those more important ones.	1	2	3	4	5	6
I have special techniques to keep my concentration focused when learning academic writing.	1	2	3	4	5	6

Time management	Strongly disagree	Disagree	Slightly disagree	Partly agree	Agree	Strongly agree
I think I can achieve my writing goals within the intended period.	1	2	3	4	5	6
I think I can manage my time well for completing most writing tasks.	1	2	3	4	5	6
I have special techniques to complete my writing tasks on time.	1	2	3	4	5	6

Environment	Strongly disagree	Disagree	Slightly disagree	Partly agree	Agree	Strongly agree
When learning and practicing writing, I know how to arrange the environment to make learning more efficient.	1	2	3	4	5	6
When learning and practicing writing, I am aware that the learning environment matters.	1	2	3	4	5	6
When I learning and practicing writing, I look for a good learning environment.	1	2	3	4	5	6

Self-rewarding	Strongly disagree	Disagree	Slightly disagree	Partly agree	Agree	Strongly agree
I promise myself something I want when I complete a specific amount of writing tasks (e.g., going to a movie, getting together with friends, a favorite CD).	1	2	3	4	5	6
I treat myself for a good meal after completing an important writing assignment/test.	1	2	3	4	5	6

Maintain Interest	Strongly disagree	Disagree	Slightly disagree	Partly agree	Agree	Strongly agree
Once the novelty of learning writing is gone, I easily become impatient with it.	1	2	3	4	5	6
In writing learning, I am confident that I can overcome any sense of boredom.	1	2	3	4	5	6
In writing learning, I know how to make my writing process more interesting and enjoyable.	1	2	3	4	5	6

Emotion	Strongly disagree	Disagree	Slightly disagree	Partly agree	Agree	Strongly agree
When I feel stressed about writing learning, I know how to reduce this stress.	1	2	3	4	5	6
When I feel stressed about writing learning, I think about the goals I have set for myself (how what I do now may affect my future).	1	2	3	4	5	6
When I feel stressed about writing learning, I encourage myself to continue by thinking about my past achievement.	1	2	3	4	5	6
When I feel stressed about writing learning, I encourage myself to continue by setting a reward for myself if my learning goal is achieved.	1	2	3	4	5	6

Self-observation	Strongly disagree	Disagree	Slightly disagree	Partly agree	Agree	Strongly agree
I check from time to time whether my writing learning is on a good track.	1	2	3	4	5	6
I record my writing process and progress regularly.	1	2	3	4	5	6
I test myself periodically to see whether I have made the progress as intended.	1	2	3	4	5	6

3. Self-reflection Phase

Self-evaluation	Strongly disagree	Disagree	Slightly disagree	Partly agree	Agree	Strongly agree
I will check regularly whether my writing learning goal has been achieved or not.	1	2	3	4	5	6
I will reflect whether my goal is appropriate or not.	1	2	3	4	5	6
When I self-evaluate my writing learning progress, I know what standards I should compare to.	1	2	3	4	5	6
When I self-evaluate my writing learning progress, I will take into the amount of work/time I spent on the learning tasks.	1	2	3	4	5	6

Evaluate the task strategies	Strongly disagree	Disagree	Slightly disagree	Partly agree	Agree	Strongly agree

At the end of my writing learning, I will reflect whether my learning approaches/strategies are appropriate or not.	1	2	3	4	5	6
At the end of my writing learning, I know clearly what my strength and weakness are in my approaches to the writing tasks.	1	2	3	4	5	6
At the end of my writing learning, I start to think of how to make adjustment to my learning approaches for future tasks.	1	2	3	4	5	6

Future planning	**Strongly disagree**	**Disagree**	**Slightly disagree**	**Partly agree**	**Agree**	**Strongly agree**
I will make a better study plan in future.	1	2	3	4	5	6
I will know how to make my writing study more effective.	1	2	3	4	5	6
I will know how to make my writing study more successful.	1	2	3	4	5	6

Reference:

Ma, Q. (2019). A self-regulated and personalised vocabulary learning approach mediated by mobile technologies for university students. *General Research Fund Project*, RGC, Hong Kong.

Appendix H – Interview questions

INTERVIEW QUESTIONS

1. Did you enjoy the technology-enhanced self-regulated writing training carried out in this semester's writing course? *If yes, would you please share your feelings about the training?*

2. How different was the self-regulated writing training course from other EFL writing courses you had experienced in other classes?

3. Did you think that the self-regulation training was helpful to you?

4. How did the training course affect your writing motivation/ writing engagement/ writing self-confidence? Give some specific training activities as examples.

5. How did your academic performance improve as a result of participating the training course? Give some specific training activities as examples.

6. How did your writing self-regulation skills improve as a result of participating the training course? Give some specific training activities as examples.

7. How did you perceive the role of technology in helping you self-regulate their writing learning after the training? 2

8. How did the training influence the use of technology for writing self-regulation after the training? Give some specific training activities as examples

9. Do you think that the training course should be included in the other writing courses in the upcoming semester? *Please elaborate on your answer.*

10. Have you faced any learning difficulties or negative feelings when attending the training course?

Appendix I – Training Handouts (Self-regulation)

SELF-REGULATION

I. FORETHOUGHT PHASE

1. Goal setting

What is your goal of vocabulary learning for this semester?
E.g.:

- *Learn more academic vocabulary*
- *Be able to write in English complete my assignments*
- *Talk to others in English more fluently*

Setting up a reasonable and concrete vocabulary learning goal by

E.g.:

- *Talking to foreigners in English more fluently*
- *Learning 5 jargons related to my academic stream*

2. Strategic planning

What's your plan for vocabulary learning this semester?

E.g.:

- *I plan to read English news every day for half an hour and record 5-10 new vocabulary items in my notebook*
- *I plan to use a vocabulary app, following the learning plan suggested by it, and learn 10 words everyday*
- *I plan to work with classmates speaking English in doing group work so that I have the opportunities to learn more English vocabulary.*
- *I plan to join in the English corner every day for about 1 hour to speak with the international assistant.*

3. Self-efficacy

Can you form new sentences from words you have just learnt?

E.g.:

- *Yes, I am able to do so easily.*
- *I can but I can just use them to form a rather simple sentence. For example, I make the sentence "I am a novice" for the newly learnt word "novice"*

Can you understand English films without subtitles?

E.g.:

- *Yes, I'm pretty sure I can*
- *It is difficult for me to understand English films without subtitles.*

II. PERFORMANCE PHASE

1. Task strategies

- What strategies will I use to learn vocabulary?
- What are some of the good strategies used by myself in the past?
- What are some of the good strategies used by my friends/ classmates or suggested by my teachers?

E.g.:

- *Engage in additional academic journal reading*
- *If there are the same text in two languages, I choose to read in the target language.*
- *I first use my phone to record myself saying the words. Then I listen to myself and write down the words to check the spellings. Besides, I will review the words once a week.*
- *Some of my friends use vocabulary builder apps to remember words. Since it saves a lot of time. Now I am trying this way out.*

2. Time Management

What time do I have every day or every week in study?

At what time shall I study?

- *I tend to read texts in public transport.*
- *I read leisure texts in Vietnamese and English after study*
- *The time to study would be flexible every day from 15 minutes to 2 hours. I usually put the first 15 minutes in the morning, and if I've got some spare time, I'll do more. It's better to study every day in a short time rather than to study for a long time in one day.*

3. Environment

Where should I study? In the library, on the bus or before going to bed?

When the environment is too noisy, how should I make the environment more helpful so that I can concentrate?

- *If I am on the public transport, I tend to use earphones and listen to some pleasant music so as to separate myself from the noise.*
- *I make efforts to ignore the noise and concentrate on the learning*
- *I will change the place when the environment is too noisy*

4. Self-rewarding

Will you promise yourself some kind of a reward if you get the English assignment done?

- *I promise myself something I want when I complete an important English assignment, e.g. going to a movie, getting together with friends, a favorite CD.*

5. Maintain interest

When you feel bored, how do you maintain your interest to keep studying?

- *I make studying more enjoyable by turning it into a game*
- *I do something I enjoy before going back to study again*

6. Control emotions

When you feel distressed, i.e., you did not make expected progress, what strategies do you use to get rid of the distressed and continue to study?

- *I take a break*
- *I listen to music to calm down*
- *I take deep breath to get relaxed*
- *Eat snacks*
- *I think about the goals I have set for myself (how what I do now may affect my future)*

III. SELF-REFLECTION PHASE

1. Self-evaluation

How do you evaluate your learning outcome last semester?

- Compared with my classmates, I feel…..

- Compared with myself in the past, I feel…..

2

E.g.:

- *Compared with my classmates, my GPA is pretty good*
- *Compared with the last semester, I think I have made quite a lot of progress*
- *The vocabulary app shows that I have learned 300 new words this semester and I'm quite happy about it.*
- *I am happy with my learning outcomes, as I can understand the news and articles better and more quickly than before.*

2. Evaluate the task strategies

What are the main strategies you used in study in the last few months?

How do you evaluate the strategies you used in study in the last few months? How effective are they?

What made your vocabulary learning successful/ unsuccessful in the last few months?

- *I choose to Wikipedia or Google out everything that I don't know about the words I don't know.*
- *The strategies have broadened my knowledge based on various matters.*
- *I have used the vocabulary app to enlarge my vocabulary in the last few months. And I evaluate my process through the data collected and reorganized by the app.*

3. Future planning

In future for making a similar study plan, how shall I make my study more effective and successful?

- *I'll learn from past mistakes and try to make my learning more effective. I'll try to have strong discipline on oneself, so as to achieve my goals set out no matter what happens.*
- *I'll check my vocabulary learning progress more regularly such as the total amount of vocabulary I have learned and the time to understand news.*

Appendix J – Training Handouts (Vocabulary learning)

VOCABULARY LEARNING

For University Students

I. FOUR STAGES OF SUCCESSFUL VOCABULARY LEARNING

1. Stage 1: DISCOVERING

First you need to notice that some words are new or unknown to you.

2. Stage 2: OBTAINING

You should find out the meaning of the new word ('superb' means wonderful in English and 'tuyệt vời' in Vietnamese

3. Stage 3: MAPPING

Try to map the word meaning with the new word (superb = super + good = wonderful)

4. Stage 4: CONSOLIDATION

Try to use the word so that you won't forget the meaning of this word (e.g. You may say "The weather is superb today. Have a nice day when you greet your friend who only speaks English)

STAGE 1: DISCOVERING THE NEW WORD

Where and how do you usually discover the new word? 2

- During the lecture
- In news/ book/ article reading?
- In movie watching?
- In chatting with others

Student Sharing

(1) Online articles

(2) I usually find new words in my every day reading in the book named Our Daily Bread and in watching CNN student news, a ten-minute video on the website

(3) Academic Journals

STAGE 2: OBTAINING THE WORD MEANING

How do you obtain the word meaning?

- Via guessing/ dictionary/ analyzing the word structure?
- Or asking others?

Student Sharing

(1) I usually guess the word meaning from the context or ignore some unknown words at first. But when some key words cannot be guessed out, I would check the electronic dictionary app to find the word meaning

(2) I would google it

(3) I analyze the meaningful parts that make up the word to guess its meaning (e.g. un-true)

STAGE 3: MAPPING THE WORD WITH WORD FORM

Will you record the word? How?

- In a notebook?
- Keep it in the dictionary?

Student Sharing

(1) Now, I usually use vocabulary learning apps to memorize the word by connecting the word to the right picture.

How do you map the word meaning with its form? 2

How do you memorize the word meaning?

Student Sharing

(1) In brain memory

(2) Beside the text (on paper)

STAGE 4: CONSOLIDATING THE WORD

How do you use the newly learned word?

- Using it in speaking or writing
- Trying to read more to encounter it?

Student Sharing

(1) I prefer to use the newly learned word by making my own sentences. If the time is limited, I would speak the sentence out.

(2) The best way is to write it down, so that the words become more visible.

(3) The next time I encounter the word in texts and try to recall its meaning