



UNIVERSITI PUTRA MALAYSIA

***SELF-REGULATED LEARNING INTERVENTION ON GRAMMAR
ACHIEVEMENT, SELF-REGULATED LEARNING STRATEGY USE, AND
CALIBRATION ACCURACY AMONG VIETNAMESE HIGH SCHOOL
LEARNERS***

TRUONG THI NHU NGOC

FPP 2022 1



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By

TRUONG THI NHU NGOC

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in
Fulfilment of the Requirements for the Degree of Doctor of Philosophy**

February 2022

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Doctor of Philosophy

SELF-REGULATED LEARNING INTERVENTION ON GRAMMAR ACHIEVEMENT, SELF-REGULATED LEARNING STRATEGY USE, AND CALIBRATION ACCURACY AMONG VIETNAMESE HIGH SCHOOL LEARNERS

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February 2022

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Self-regulated learning (SRL) was documented as effective in enhancing academic performance and strategy use for school subjects but has yet to be investigated for grammar instruction in English as a foreign language (EFL) contexts, including Vietnam. Because most Vietnamese public high school students lack the self-regulatory ability and have problems with English grammar learning, SRL strategy training is essential, hypothesized to enhance grammar achievement and strategy use. Grounded on Bandura's (1986) social cognitive theory (SCT) and Nelson and Narens' (1990) metamemory theoretical framework (MMTF), an SRL intervention on grammar learning was designed. The study adopted a mixed-methods explanatory sequential approach in which the quantitative data collection and analysis preceded the qualitative phase and received primary importance. The quantitative phase examined the effects of an SRL intervention on Vietnamese public high school students' grammar achievement, SRL strategy use, and calibration accuracy (CA), measured at three-time points. Meanwhile, the qualitative phase explored the sources students use to make calibration judgments and their experience of participating in the experiment.

Thirty Vietnamese tenth-grade students participated in a quasi-experiment. While the treatment ($n = 15$) received a five-week SRL intervention that introduced an SRL model and trained SRL strategies, the control ($n = 15$) received the traditional instruction. Repeated measures analyses showed that the intervention had a moderate within-subject effect on grammar achievement ($p = .04$) and a high within-subject effect on SRL strategy use ($p = .00$). Moderate interaction effects between time and group were found for grammar achievement ($p = .03$) and SRL scores ($p = .03$). However, no between-subject effect was found for grammar achievement ($p = .58$) and SRL scores ($p = .55$), although the treatment scored higher than the control on these outcomes. The Friedman tests showed a small within-subject effect on predictive CA ($p = .02$) but no within-

subject effects on postdictive CA for treatment ($p = .90$). The Mann-Whitney U tests showed that the treatment calibrated more accurately than the control for predictive CA on post-test ($p = .00$) and postdictive CA on post-test ($p = .01$) and delayed post-test ($p = .048$).

After the post-test, participants had their reflection journals collected, and three from each group were invited for the interview. The findings reveal that both groups ascribed calibration judgments to controllable (e.g., effort and previous learning experience) and uncontrollable factors (i.e., memory-based cues). However, strategy use (e.g., guessing based on native language) is exclusive to the treatment. Besides, both groups recorded positive changes in personal (i.e., personal attributes, language-related knowledge, and skills) and behavioral (i.e., self-regulation) factors with varying degrees. Nevertheless, the treatment reported employing various SRL strategies, especially metacognitive strategies, more than the control, and their knowledge of cognition and thinking skills also improved.

The findings provide valuable information for Vietnamese curriculum designers and English instructors about the effects of an SRL intervention and its successful elements in improving grammar performance and strategy use. The study also has significant theoretical implications concerning the necessity of integrating SCT and MMTF to explain self-regulation in grammar learning. SCT expounds on essential components of SRL, which embraces the environmental, personal, and behavior factors but does not detail how knowledge is acquired, retrieved, and retained, which MMTF complements and explains under crucial SRL processes (monitoring and control).

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

**INTERVENSI PEMBELAJARAN REGULASI KENDIRI TERHADAP
PENCAPAIAN TATABAHASA, PENGGUNAAN STRATEGI SRL DAN
KETEPATAN KALIBRASI DALAM KALANGAN PELAJAR SEKOLAH
MENENGAH VIETNAM**

Oleh

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Pembelajaran terkawal sendiri (SRL) telah didokumenkan sebagai berkesan dalam meningkatkan prestasi akademik dan penggunaan strategi untuk mata pelajaran sekolah tetapi masih belum disiasat untuk pengajaran tatabahasa dalam konteks bahasa Inggeris sebagai bahasa asing (EFL), termasuk Vietnam. Oleh kerana kebanyakan pelajar sekolah menengah awam Vietnam tidak mempunyai keupayaan kawal selia sendiri dan menghadapi masalah dengan pembelajaran tatabahasa Bahasa Inggeris, latihan strategi SRL adalah penting, dihipotesiskan untuk meningkatkan pencapaian tatabahasa dan penggunaan strategi. Berdasarkan teori kognitif sosial (SCT) Bandura (1986) dan kerangka teori metamemori (MMTF) Nelson dan Narens (1990), satu intervensi SRL tentang pembelajaran tatabahasa telah direka bentuk. Kajian ini menggunakan pendekatan berurutan penjelasan kaedah campuran di mana pengumpulan dan analisis data kuantitatif mendahului fasa kualitatif dan menerima kepentingan utama. Fasa kuantitatif mengkaji kesan campur tangan SRL terhadap pencapaian tatabahasa pelajar sekolah menengah awam Vietnam, penggunaan strategi SRL dan ketepatan kalibrasi “*calibration accuracy*” (CA), diukur pada titik tiga masa. Sementara itu, fasa kualitatif meneroka sumber yang digunakan oleh pelajar untuk membuat pertimbangan penentuan dan pengalaman mereka menyertai eksperimen.

Tiga puluh pelajar mengambil bahagian dalam kajian (15 untuk kumpulan rawatan dan 15 untuk kumpulan kawalan). Intervensi SRL selama lima minggu dilakukan dengan 15 pelajar kelas sepuluh Vietnam. ANOVA/ANCOVA pengukuran berulang menunjukkan bahawa intervensi mempunyai kesan dalam-subjek yang sederhana terhadap pencapaian tatabahasa ($p = .04 < .05$) dan kesan dalam-subjek yang tinggi terhadap penggunaan strategi SRL ($p = .00 < .05$). Langkah berulang menunjukkan bahawa intervensi mempunyai kesan dalam subjek Kesan interaksi sederhana antara masa dan kumpulan didapati untuk skor pencapaian tatabahasa ($p = .03 < .05$) dan skor penggunaan strategi

SRL ($p = .03 < .05$). Walau bagaimanapun, tiada kesan antara kumpulan ditemui untuk pencapaian tatabahasa ($p = .58 > .05$) dan skor penggunaan strategi SRL ($p = .55 > .05$) walaupun kumpulan rawatan mendapat markah lebih tinggi daripada kumpulan kawalan pada hasil ini. Ujian Friedman menunjukkan kesan dalam-subjek kecil pada CA ramalan global ($p = .02 < .05$) tetapi tidak ada kesan dalam subjek pada CA pasca ramalan global untuk kumpulan rawatan. Ujian Mann-Whitney U menunjukkan kesan antara subjek yang sederhana terhadap CA ramalan pelajar pada ujian pasca ($p = .00 < .05$) dan kesan antara subjek yang kecil terhadap CA pasca ramalan pelajar pada ujian pasca ($p = .01 < .05$) dan ujian-tertunda ($p = .048 < .05$) menunjukkan bahawa kumpulan rawatan melakukan kalibrasi dengan lebih tepat.

Selepas ujian pasca, para peserta telah mengumpul jurnal refleksi mereka, dan tiga daripada setiap kumpulan telah dijemput untuk temu duga. Penemuan mendedahkan bahawa kedua-dua kumpulan mengaitkan pertimbangan penentuan kepada faktor yang boleh dikawal (cth., usaha dan pengalaman pembelajaran sebelumnya) dan faktor yang tidak boleh dikawal (iaitu, isyarat berasaskan ingatan). Walau bagaimanapun, penggunaan strategi (cth., meneka berdasarkan bahasa ibunda) adalah eksklusif untuk rawatan. Selain itu, kedua-dua kumpulan merekodkan perubahan positif dalam faktor peribadi (iaitu, sifat peribadi, pengetahuan dan kemahiran berkaitan bahasa) dan tingkah laku (iaitu, peraturan sendiri) dengan tahap yang berbeza-beza. Namun begitu, rawatan dilaporkan menggunakan pelbagai strategi SRL, terutamanya strategi metakognitif, lebih daripada kawalan, dan pengetahuan mereka tentang kognisi dan kemahiran berfikir juga bertambah baik.

Penemuan ini memberikan maklumat berharga untuk pereka kurikulum Vietnam dan pengajar bahasa Inggeris tentang kesan campur tangan SRL dan elemen kejayaannya untuk meningkatkan prestasi tatabahasa dan penggunaan strategi. Kajian ini juga mempunyai implikasi teori yang signifikan mengenai keperluan mengintegrasikan SCT dan MMTF untuk menjelaskan peraturan sendiri dalam pembelajaran tatabahasa. SCT menerangkan tentang komponen penting SRL, yang merangkumi faktor persekitaran, peribadi dan tingkah laku tetapi tidak memperincikan cara pengetahuan diperoleh, diperoleh dan disimpan, yang MMTF melengkapkan dan menerangkan di bawah proses SRL yang penting (pemantauan dan kawalan)

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LIST OF ABBREVIATIONS

ALM	Audio Lingual Method
AVE	Average Variance Extracted
BALLI	Beliefs about Language Learning Inventory
CA	Calibration Accuracy
CBI	Comprehension-Based Instruction
CCL	Cognitive Code Learning
CFA	Confirmatory Factor Analysis
CLT	Communicative Language Teaching
CR	Composite Reliability
DM	Direct Method
EFA	Exploratory Factor Analysis
EFL	English as a Foreign Language
EOL	Ease of Learning
ESL	English as a Second Language
FLA	Foreign Language Anxiety
FOF	Focus-on-Form
FOFs	Focus-on-Forms
FOK	Feeling of Knowing
GLSs	Grammar Learning Strategies
GLSI	Grammar Learning Strategy Inventory
GTM	Grammar Translation Method
IMSR	Inventory of Metacognitive Self-Regulation
JOL	Judgment of Learning

LLSs	Language Learning Strategies
MD	Mahalanobis Distance
MK	Metacognitive Knowledge
ME	Metacognitive Experiences
MOET	Ministry of Education and Training
PBI	Production-Based Instruction
PI	Processing Instruction
QSRLSLEG	Questionnaire of Self-Regulated Learning Strategies in Learning English Grammar
SCT	Social Cognitive Theory
SE	Self-Efficacy
SLA	Second Language Acquisition
SRL	Self-Regulated Learning
SRSI-SR	Self-Regulation Strategy Inventory-Self-Report
TI	Traditional Instruction
UOL	Uniqueness of Language

CHAPTER 1

INTRODUCTION

This chapter begins with the study background, problem statements, research objectives, research questions, and hypotheses. The subsequent sections entail the significance of the study, research limitations, and conceptual and operational definitions.

1.1 Background of the Study

Early research in language learning strategies (LLSs) commenced with Rubin's (1975) work describing good language learners' characteristics and effective strategies. Since then, a deluge of studies have been conducted to expand this field from developing general LLSs (e.g., Hosenfeld, 1976; Huang, 2018; Naiman et al., 1978; Nyikos & Oxford, 1993; Oxford, 1986; Stern, 1975; Wenden, 1987) to strategies used for specific language skills such as reading (e.g., Hosenfeld et al., 1981), listening (e.g., O'Malley et al., 1985) and writing (e.g., Zimmerman & Martinez-Pons, 1990). Teaching students with LLSs has been proven effective in boosting students' language proficiency and performance (DeBoer et al., 2018; Dignath et al., 2008). Despite the existence of numerous strategy instruments, a common grouping of the strategies often involves metacognition (planning, selective attention, self-monitoring, problem presentation, and evaluating), cognition (elaboration, deduction/induction, inferencing, note-taking, substitution, and summarizing), and socialization/affect (questioning, cooperating, and self-talking) (Chamot, 1993; Oxford, 1986).

Notably, in recent decades, there have been paradigm shifts in conceptualization from the notion of strategic learning (i.e., focusing on specific strategic behavior) to self-regulation (i.e., understanding the underlying trait from learners' employment of strategies) (Dörnyei, 2014; Oxford, 2016d; Stevens, 2016; Tseng et al., 2006). This paradigm shift leads to contentions among scholars as to whether self-regulation studies should replace learning strategy research. Dörnyei (2014) and Tseng et al. (2006) contended that traditional language learning strategy scales had less psychometric soundness than self-regulation questionnaires. Meanwhile, Oxford (2016d) and Rose et al. (2018) proposed that the study framework should not be restricted to only self-regulation or traditional language learning strategies, but both frameworks should be combined to comprehend a bigger view of L2 learning.

Despite the continuous debate about strategic learning and self-regulation (Rose, 2012), recent studies (e.g., X. Chen et al., 2020; Tragant et al., 2013; C. Wang et al., 2013) have focused on designing instruments to examine students' self-regulation in learning languages. Also, self-regulation instruments for learning language skills such as reading (e.g., L. J. Zhang, 2001) and writing (e.g., Zhang & Qin, 2018) have been designed. Moreover, numerous research has been conducted in English as a foreign language

(EFL) contexts in LLSs (e.g., Huang, 2018; Takeuchi, 2003), self-regulated learning (SRL) strategies (e.g., Sun & Wang, 2020; C. Wang et al., 2013) and strategy intervention (e.g., Aghaie & Zhang, 2012; De Silva & Graham, 2015).

Also, empirical studies that focus on SRL strategies or examine the impact of SRL have increased. The results of most SRL intervention programs have been consistent concerning the overall positive effects of SRL strategies on academic performance, learning motivation, and achievement (e.g., DeBoer et al., 2018; DeBoer et al., 2013; Dignath et al., 2008; Kim et al., 2015; Kostons et al., 2012; Tavakolizadeh & Ebrahimi-Qavam, 2011). Also, most intervention studies on SRL have been administered in educational settings, mainly primary and secondary schools, with large effect sizes (e.g., DeBoer et al., 2018; DeBoer et al., 2013; Donker et al., 2014). Moreover, recent studies tended to incorporate SRL instruction across various school subjects (DiBenedetto, 2018) because SRL is crucial to competence development in the long term (European Council, 2002).

When designing an intervention, it is essential to consider many contributing elements reported in prior studies that are vital to its success, such as school level, training components, theories, implementer, and instrument. Meta-analyses of SRL interventions reported larger effect sizes for primary and junior secondary schoolers than older students (e.g., Hattie et al., 1996). Also, students tended to outperform in training programs that included cooperative learning and metacognition (e.g., Dignath & Büttner, 2008; Kramarski & Mevarech, 2003). Likewise, an intervention that emphasized metacognitive strategies produced larger effect sizes for academic performance and strategy use than those focused on only cognitive strategies (Dignath & Butner, 2008). Also, studies designed on metacognitive or socio-cognitive theoretical frameworks had larger effect sizes for academic performance than those based on motivation-related theories (Dignath & Butner, 2008). When the researcher was the implementer rather than the regular teacher, larger effect sizes for training programs were yielded (Dignath & Butner, 2008). Moreover, intervention programs were more effective with small groups than large groups (C. W. Chiu, 1998) and when self-developed tests were used (Donker et al., 2014).

Furthermore, several metacognitive strategies included in SRL interventions have been found effective for school students and theorized to predict academic success as empirical studies have shown medium to high effects (Dignath & Büttner, 2008; Ghanizadeh, 2017; Hacker et al., 2000; Isaacson & Fujita, 2006; Thiede et al., 2003). Donker et al. (2014) found that effect sizes were larger when metacognitive reflection was combined in training. Also, previous studies indicated that metacognitive monitoring correlated highly with academic achievement (e.g., Callan & Cleary, 2019; Commander et al., 2014; DiBenedetto & Zimmerman, 2013; Lin et al., 2001). It also correlated with self-reflection (e.g., DiBenedetto & Zimmerman, 2013; Ghanizadeh, 2017) and enhanced SRL strategy use (e.g., Hsu, 2020). Learners who acquire more metacognition knowledge tend to be more likely to succeed in problem-solving. They also become more metacognitive and flexible in employing learning strategies than those who are not taught when and how to use specific strategies (DeBoer et al., 2018).

Meta-analytical findings of intervention studies performed by Donker et al. (2014) indicate that studies incorporating metacognition knowledge, i.e., training learners on how to plan, when, why, how, and which strategy to use, enhanced their performance the most effectively. Also, DeBoer et al. (2018) concluded in their meta-analyses of 48 intervention studies that the effectiveness of the strategy intervention, which includes the metacognitive components, is maintained and slightly increases even after the completion of the intervention. This finding indicates that students' learning skills continue to develop after the intervention ends. Thus, the school program should implement strategy intervention focusing on metacognition because of its sustained effects on students' academic performance.

When designing an SRL intervention, the researcher needs to consider SRL models. An appropriate model can delineate how learners activate and strengthen their behavior, feelings, and cognition to attain their goals (Schunk, 2008a). Also, it is necessary to design the intervention based on an SRL model to enhance the effectiveness of the intervention because models of SRL have been effectively applied in education (Zimmerman, 2000e). For instance, Panadero (2017) highlighted that Zimmerman and Moylan's (2009) SRL model had received considerable empirical evidence and support. Moreover, this SRL model was designed from Bandura's (1989a) social-cognitive theory tailored explicitly to SRL interventions (Dignath et al., 2008; Dignath & Büttner, 2008).

Besides, a reliable strategy instrument is necessary to assess students' employment of SRL. However, existing tools developed to evaluate students' self-regulation, or SRL strategy use were mainly designed for learning science subjects. Hence, when it comes to language learning, various reference sources tend to be used to design SRL instruments (e.g., Chularut & DeBacker, 2004; Fentaye, 2017; Sardare et al., 2012). Popular tools such as Pintrich et al.'s (1991) Motivated Strategies for Learning Questionnaire (MSLQ), Oxford's (1990a) Strategy Inventory for Language Learning (SILL), and Weinstein et al.'s (1988) Learning and Study Strategies Inventory (LASSI) were adapted. However, these instruments were initially developed to assess students in L1 contexts and, thus, may not be suitable for L2 settings. Though applied in diverse fields, these instruments lack empirical validity for the L2 learning milieu (L. S. Teng & Zhang, 2016). Thus, if the researcher performs an SRL intervention in the EFL learning context, they need to develop an instrument to measure EFL students' SRL strategy use, which accommodates characteristics of the L2 learning context and includes the metacognitive component. Moreover, it is essential to provide an insightful understanding of the participants' metacognitive activities via triangulation, i.e., collecting different data types (Dinsmore et al., 2008).

Despite a considerable body of research on English teaching methodologies (e.g., V. V. Hoang, 2010; Phan, 2018) in Vietnam, very few have examined students' SRL in high school (e.g., C. L. Ngo, 2019; T. Q. Tran & Phan Tran, 2021), and university (e.g., N. Ngo, 2019; T. B. T. Nguyen, 2018; V. T. Nguyen, 2016; Nhan & Lai, 2013) in the country. These studies had reasonably consistent findings that Vietnamese college students' language learning strategy use was at a medium level. Also, Q. T. Tran and C.

H. L. Nguyen (2020) found that Vietnamese college students lack an understanding of self-regulation. H.A.V. Nguyen et al. (2018) reported that Vietnamese students encounter challenges with modern teaching methods, i.e., flipped classrooms, because they cannot self-regulate their learning. However, no research has been reported investigating the effectiveness of SRL intervention on high school students in Vietnam in recent years.

Most English language programs in Vietnamese high schools mainly focus on grammar and vocabulary, with explicit grammar teaching being the most popular instructional method (Bock, 2000; N. T. T. Phan, 2018). Besides, despite being sent to language training schools to learn modern teaching approaches, most teachers continued to use the traditional method in their practical teaching context (H. C. Pham, 2007; L. H. N. Phan, 2017). In other words, most Vietnamese high school students continued to learn grammar in form-focused classrooms (N. T. T. Phan, 2018). Despite learning English for many years, most students still find it hard to use even simple and common vocabulary and grammar to communicate in the English language in daily conversations (C. T. Nguyen & D. T. K. Le, 2020). Dan (2008) found that both Vietnamese English major and non-English major college students encountered common problems with English grammar and committed widespread errors with tense and aspect despite spending years learning English. When Vietnamese students learn English grammar, they tend to copy down the structures, do exercises and use the memorization strategy most frequently (T. H. O. Duong & T. T. Nguyen, 2006), indicating a lack of SRL knowledge and strategy use. Hence, an SRL intervention is necessary to improve Vietnamese high school students' self-regulation in learning grammar and grammar achievement.

1.2 Problem Statement

Prior studies indicated that direct teaching of general study skills is not practical, which needs to be related to specific subject domains and include metacognition to yield a large effect size (Hattie et al., 1996). When the teaching context supports a strategy training program, the outcomes will be more likely to be positive (DeBoer et al., 2013). Moreover, SRL interventions that include a metacognitive component were more effective (Donker et al., 2014). Also, they are more likely to produce a follow-up effect than interventions without this component (DeBoer et al., 2018). Metacognitive strategies include but do not limit to planning, monitoring, and evaluating (Efklides, 2008a). Still, recent SRL interventions have focused on self-monitoring and self-reflection to foster metacognition in academic contexts (e.g., Hacker et al., 2019; Nietfeld et al., 2005; Schraw, 2009a) and language learning (e.g., Haukas, 2018; F. Teng, 2020; Wenden, 1987). Monitoring enables individual learners to select and assess task demands, be conscious of their errors, and produce internal feedback. Meanwhile, self-reflection assists learners in interpreting the self-generated feedback and learning from their mistakes to make proper decisions to enhance future learning and performance (Zimmerman, 2000e). Knowledge of which strategy to employ, when, how, and why to utilize strategies contribute to students' metacognitive skills (DeBoer et al., 2018). Thus, researchers should consider the critical role of metacognition in language learning

(Wenden, 1987) because of its positive impact on academic achievement and SRL strategy use (Donker et al., 2014; Ghanizadeh, 2017; Muijs & Bokhove, 2020).

However, most SRL interventions in the English subject are primarily conducted for language skills, such as reading (e.g., Souvignier & Mokhlesgerami, 2006; Stoeger et al., 2014; L. S. Teng & Zhang, 2020a; F. Teng, 2020), listening (e.g., Coskun, 2010; Vandergrift, 2003), writing (e.g., Alfassi, 2002; Broer et al., 2002; Brunstein & Glaser, 2011; Festas et al., 2015; F. Teng, 2020) and speaking (e.g., Maleki, 2007). Few studies, however, have examined the effect of such intervention on students' English grammar learning (e.g., Lai & Lin, 2015), which is a crucial component in language skill learning. In another sense, limited academic interest has been drawn to SRL in learning English grammar (Trendak, 2015), while most EFL learners, such as those in Vietnam, have problems with grammar learning (Dan, 2008). The paucity of studies on the effects of SRL intervention on English grammar learning is a significant research gap in self-regulation and second language learning research.

Also, few studies mentioned the theoretical framework and SRL model in their second language instruction intervention and may have been built on intuition and convenience (Plonsky, 2011). Similar problems occurred in many SRL interventions when strategies were chosen for the training without reference to the theoretical framework and model (e.g., Festas et al., 2015; Lau, 2020; Mason, 2004; Sontag & Stoeger, 2015). Lennon (2010) suggested that there should be SRL models for specific domains. It is because self-regulation is subject-sensitive and detailed due to the variations in learners' past experiences, motivation, and certain types of tasks, which can guide the researcher thoroughly in designing a logical and effective SRL intervention. Hence, to fill this research gap, this study adopted Bandura's (1986) social cognitive theory, Nelson and Narens' (1990) metamemory theoretical framework, Schmidt's (1990) noticing hypothesis, and Zimmerman and Moylan's (2009) SRL model.

Besides, calibration, a component of metacognitive monitoring, is essential for improving learners' self-regulatory capabilities. It has also been widely researched (e.g., Dinsmore & Parkinson, 2013; Lin et al., 2001; Tuysuzoglu & Greene, 2015; Zabucky et al., 2009). Students must monitor their learning during an SRL learning process by making confidence judgments to evaluate whether their answers to the test were accurate (Stone, 2000). Although researched in diverse disciplines, most calibration studies were conducted in the States to measure university students' judgments of writing performance and reading comprehension of learning texts (e.g., Chiu, & Klassen, 2009; Singer Trakhman et al., 2019; Y. Wang & List, 2019). Thus, there is a paucity of studies into the effects of SRL interventions on grammar learning, including the calibration component, prompting students to make confidence judgments, which is a potential research gap. Besides, asking students to estimate their confidence before and after completing a task may metacognitively stimulate the superior monitoring of their learning in the performance phase, resulting in more effective reflective processes (e.g., Hacker et al., 2008; Nelson & Narens, 1990).

Designing an SRL intervention that combines all the successful elements from prior studies (e.g., including metacognition and calibration component and having a sound theoretical framework and model) is essential because these elements can help maximize the effectiveness of the intervention. Since Vietnamese students lack self-regulated learning skills and have problems with grammar learning (Dan, 2008; H. A. V. Nguyen et al., 2018; Q. T. Tran & C. H. L. Nguyen, 2020), implementing an SRL intervention for grammar learning is vital. Studies have shown that a lack of adequate SRL strategies such as self-reflection and self-monitoring can hamper learners from self-regulating successfully and making proper decisions during their learning journey (Dunlosky & Rawson, 2012; Hacker et al., 2008). Moreover, low-achieving students lack metacognitive knowledge and monitoring accuracy (Bol et al., 2010; Nietfeld et al., 2005; Y. Wang & List, 2019). Thus, the SRL processes, known for their transferability (Teeuwen, 2019), can equip learners with essential knowledge, skills, and strategies for their lifelong learning journey and promote success in school and life (DiBenedetto, 2018).

Admittedly, learners who receive SRL training can benefit in three main areas: motivation to learn, academic success, and learning strategies (Dignath & Büttner, 2008; Zimmerman, 1990b; Zimmerman & Schunk, 2001). Self-regulated learners participate actively concerning metacognition, motivation, and behavior (DeBoer et al., 2018; Zimmerman, 1986). However, most high school contexts in Vietnam proffer few opportunities for teaching SRL strategies in learning English grammar to high school students. Also, most recent studies mentioned that students cannot self-regulate their learning (Ho et al., 2021; H. A. V. Nguyen et al., 2018) due to grammar-based instruction in traditional classrooms (Phung, N. Tran & D. Hoang, 2021). Thus, this line of research lacks empirical studies. Also, low entry achievement scores in English high-stakes exams, in which grammar constitutes an essential component (T. Duong, 2017; H. Le, 2019; Dang, 2020), present a potential obstacle to Vietnamese students' overall success in being admitted to the program they wish to follow. Thus, this study was designed to fill this practice gap by conducting an SRL intervention on grammar learning to prepare Vietnamese high school students for more effective and efficient future grammar learning stages.

In light of the research and practice gaps mentioned above, there is a need for Vietnamese learners to be taught SRL strategies to become autonomous or self-regulated in learning English grammar. Also, when designing an SRL intervention, combining all successful elements in previous SRL interventions is necessary. We can expand our understanding of the self-regulatory processes and overcome the shortcomings of many language strategy interventions implemented in a single session that fails to provide the external validity for the SRL components. If learners can evaluate what they know and do not know, they can become better self-regulated learners. Still, if they fail to self-regulate, they may have low achievement and self-efficacy, avoiding future challenging tasks (Ramdass & Zimmerman, 2008). Also, if students' confidence is over-calibrated, their academic performance can be negatively affected (Dunlosky & Rawson, 2012).

Thus, this study aims to investigate the effectiveness of an SRL intervention on SRL strategy use, grammar achievement, and calibration accuracy for Vietnamese high school language learners in Vietnam. The design of the study was based on Bandura's (1986) social cognitive learning theory, Nelson and Narens' (1990) metamemory theoretical framework, Schmidt's (1990) noticing hypothesis, and Zimmerman & Moylan's (2009) SRL model. Besides, to yield higher effects, the intervention program in this study combined successful elements of previous SRL and strategy interventions, focusing on the metacognitive and self-regulative aspects of self-regulation. An SRL intervention is essential because it can equip students with SRL strategies after the official school period and prepare them for a lifelong learning journey (DeBoer et al., 2018).

1.3 Research Objectives

This study tests the effects of an SRL intervention designed to enhance Vietnamese high school learners' grammar achievement, SRL strategy use, and calibration accuracy. The cardinal goal of the intervention is to focus on developing students' SRL strategies during grammar learning, especially metacognitive strategies (e.g., self-monitoring and self-reflection). Besides, the intervention was designed to enhance students' ability to calibrate. The intervention can strengthen the ecological validity by incorporating calibration practice into their grammar learning over time. Also, the study combined successful elements in prior self-regulation, metacognition, and strategy intervention programs by integrating their productive and functional components into one program. Finally, the study aims at understanding students' sources of calibration judgments and their experience of participating in the experiment, explored via their reflection journals and in-depth interviews.

1.4 Research Questions

The study seeks to answer the following research questions:

1. Does the SRL intervention improve Vietnamese EFL high school learners' grammar achievement scores?
2. Does the SRL intervention improve Vietnamese EFL high school learners' SRL strategy use?
3. Does the SRL intervention improve Vietnamese EFL high school learners' global predictive and postdictive calibration accuracy?
4. What sources do Vietnamese EFL high school learners base on to make calibration judgments?
5. What is Vietnamese EFL high school learners' experience of participating in the experiment?

1.5 Research Hypotheses

Accordingly, the current study tests the following hypotheses.

- H01a There is no statistically significant difference in grammar achievement scores within the groups over time.
- H01b There is no group-by-time interaction effect for grammar achievement scores.
- H01c There is no statistically significant difference in grammar achievement scores at the post-test and delayed post-test between students receiving the intervention and those who did not.
- H02a There is no statistically significant difference in SRL strategy use scores within the groups over time.
- H02b There is no group-by-time interaction effect for SRL strategy use scores.
- H02c There is no statistically significant difference in SRL strategy use scores at the post-test and delayed post-test between students receiving the intervention and those who did not.
- H03a There is no statistically significant difference in the mean rank of the global predictive calibration accuracy scores among the three time points for students receiving the intervention.
- H03b There is no statistically significant difference in the mean rank of the global predictive calibration accuracy scores at the post-test and delayed post-test between students receiving the intervention and those who did not.
- H03c There is no statistically significant difference in the mean rank of the global postdictive calibration accuracy scores among the three-time points for students receiving the intervention.
- H03d There is no statistically significant difference in the mean rank of the global postdictive calibration accuracy scores at the post-test and delayed post-test between students receiving the intervention and those who did not.

1.6 Significance of the Study

The study has three significant contributions. Firstly, the study expands the SRL research on EFL learners. As none of the SRL interventions has been conducted on EFL learners in Vietnam so far, this study was the first to contribute information about the effectiveness of such an intervention on Vietnamese learners' grammar achievement and SRL strategy use to the general picture of SRL research for EFL learners. Thus, this study complements the lack of SRL intervention research for grammar learning. It acts as a springboard for future SRL interventions to enhance EFL/ESL learners' grammar achievement and SRL strategy use and promote learner autonomy by equipping them with SRL strategies and knowledge to self-regulate their grammar learning.

Secondly, the study contributes to the theoretical underpinnings for designing SRL interventions by linking elements of the socio-cognitive theory and metacognitive theoretical framework to derive the theoretical framework and conceptual model of SRL. Also, the study provides insights into understanding how the SRL model is applicable and transferable to the EFL context and across language domains in the SRL research. The SRL intervention based on a sound theoretical framework and model is hypothesized to enhance the effectiveness of the intervention on outcome variables and inform instructional practices.

Finally, the study informs English teachers about the effects of the SRL intervention and its successful elements in modifying their instructional practices to promote success in grammar teaching and learning in high school. Also, the study updates educational psychologists on how calibration can contribute to students' successful self-regulation in grammar learning and the sources students base on to make confidence judgments. Most SRL intervention programs in the EFL domain have not included monitoring judgments as a component of the intervention, prompting students to make global calibration judgments before and after completing the test/quiz. When students are asked to rate confidence in their grammar ability, their superior metacognitive monitoring is stimulated in the performance stage, resulting in more effective self-reflective processes (Moore et al., 2005; Ramdass & Zimmerman, 2008).

1.7 Definition of Terms

This section provided the conceptual and operational definitions of three key terms: grammar achievement, self-regulated learning strategy use, and calibration accuracy.

1.7.1 Grammar Achievement

Grammar can be considered as "the business of taking a language to pieces, to see how it works." (Crystal, 2004, p. 10) and contains specific rules which govern the system of structures and linguistic units by which we communicate (Verghese, 1989). In another

sense, grammar is a part of linguistics, which is the "science of language" and also "a part of the broad field of cognitive science, which studies the human mind" (Anderson, 2018, p.11). Grammar achievement refers to accomplishing specified learning goals, the focus of instructional activities, which learners are expected to achieve. Grammar achievement is often measured through tests and assessments because they are "indicators of achievement" (Hattie & Anderman, 2013, p. 5).

In this study, grammar achievement refers to students' achievement of preselected grammatical items measured by students' scores in the pre-test, post-test, and follow-up post-test, with 0 being the lowest score and 100 (i.e., 100 percent) being the maximum score.

1.7.2 Self-Regulated Learning Strategy Use

SRL was defined in terms of motivation, behaviors, and metacognition (Zimmerman, 1986). Crucial to the SRL is metacognition, known as knowledge of cognition and regulation of cognition (Efklides, 2011b; McComb, 1986). Accordingly, Zimmerman (1986) stated that SRL strategy use refers to the use of motivation (e.g., self-efficacy, competence, and autonomy), metacognitive strategies (e.g., planning, self-monitoring, and self-evaluating), and proper behaviors (creating favorable learning contexts) to attain learning goals.

In this study, the SRL strategy use was operationally defined as the frequency of using SRL strategies measured with 24 items on the Questionnaire of SRL Strategies in Learning English Grammar. This instrument was adapted from different sources and validated in the pilot study, with a higher score indicating a greater SRL strategy use level.

1.7.3 Calibration Accuracy

Calibration has a crucial role in SRL processes since the accurate cognizance of performance can activate useful and proper self-regulatory strategies. Before calibration accuracy is defined, it is necessary to mention calibration judgments, also called confidence judgments, metacognitive monitoring judgments, or metamemory judgments which can be made at the local or global level. When students estimate confidence at the local level, they judge their confidence in their performance before or after completing each item. Meanwhile, when students estimate their confidence at the global level, they rate their confidence on the overall expected performance on the entire task or test (e.g., the estimation of the number of questions to which students hope to have correct responses out of the total number of given questions) (Nietfeld et al., 2005). However, global calibration judgments are more accurate than local judgments (Nietfeld et al., 2005; Schraw, 1994). Global calibration judgments were measured on a continuous Likert scale (0 to 100); each number corresponds respectively to 0, 10%, 20%, 30%,

40%, 50%, 60%, 70%, 80%, 90% and 100% confidence level of participants' performance.

Calibration accuracy (CA) is the difference between participants' calibration judgments of their ability to answer each test question or the whole test and their actual performance. Many indices can be used to calculate the CA to find the difference between learners' calibration judgments of their performance before (predictive) or after (postdictive) the actual performance and their actual performance (Schraw, 2009c). The measurement literature mainly distinguished relative, absolute, bias, scatter, and discrimination indices to measure CA. Among these indices, the most popular was absolute accuracy, referring to "the precision of a confidence judgment compared to performance on a criterion task" (Schraw, 2009c, p. 417). As absolute accuracy indices were more reliable and likely to observe individual differences than relative accuracy measures, they were recommended for treatment research (Dunlosky & Rawson, 2012; Hacker et al., 2008).

In this study, CA was measured using the absolute index defined operationally as the squared difference between participants' global predictive/postdictive calibration judgments and their actual grammar scores on the pre-test, post-test, and delayed post-test. CA scores range from 0, indicating absolute accuracy, and 1 denoting no accuracy.

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LIST OF PUBLICATIONS

- Truong, T.N.N., Noordin, N. & Ismail, L. (2022). Revisiting views of grammar and grammar learning strategy use among high school students. A multiple case study in Vietnam. *Language Value*. Accepted.
- Truong, T.N.N. (2022). Developing and validating an instrument to measure EFL learners' self-regulation in learning English grammar. *Frontiers in Education*, 7, 1-16.
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