Doctoral Dissertation

# A Reflective Learning Model for English Reading Supported by Mobile Technology

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# ABSTRACT

Reflection is an essential part of the learning process. People learn not only through the active process of gaining experiences but also through the reflective process of regaining those experiences. Reflective practices in learning are said to promote the development of cognitive skills, enrich content knowledge, and facilitate the management and evaluation of the learning process. As higher education prioritizes active and life-long learning as well as critical/innovative skill development, reflective learning has gained growing attention from academic and educational circles, including the domain of language education. However, research on reflection in language education has been predominantly invested in the field of teacher education whereas implementation of reflective practices for language skill improvement has been paid less attention. In addition, there is little research on designing a comprehensive reflective model to guide the whole process of language study, especially reading study, which is a fundamental part of language acquisition. Therefore, It is important to understand how reflection can affect the whole reading-learning process and how to implement it effectively throughout the whole learning process with mobile technology. The development of a reflective learning model for English reading is crucial for both learners and instructors.

The main research objective **(MRO)** of this dissertation is to design a reflective learning model for English reading supported by mobile technology to improve students' reading proficiency, self-regulated learning, and critical thinking skills. Accordingly, Three sub-objectives are set. The first sub-objective **(SRO1)** is to explore students' learning habits and perception of mobile learning in English reading learning.
The second sub-objective **(SRO2)** is to investigate students' perceptions of and preferences for reflective practices in mobile English reading. The third sub-objective **(SRO3)** is to design a reflective learning model for English reading supported by mobile technology and examine the effectiveness of the proposed learning model in improving students' reading proficiency, self-regulated learning, and critical thinking skills. Three studies were designed and implemented to achieve the three sub-objectives.

Study 1(Chapter 3) was conducted to achieve SRO1. We conducted action research to examine students' mobile device usage for studying and their willingness to integrate self-paced mobile extensive reading into their regular learning routine. After implementing extensive mobile reading as an off-curricular activity for one semester, we investigated students' perception with questionnaires and interview questions. Its finding revealed that despite the deep penetration of smartphone use in daily life, those students didn't form the habit of mobile reading. However, most students approved of this reading-learning approach and reported improvement in their reading and listening abilities. Smartphone-assisted reading was accepted for its abundance of resources and

convenience. Language learning applications and video resources were greatly favore among students. But at the same time, many problems concerning this approach emerged in the study such as distraction, cost, motivation, evaluation, etc. In addition, we attempted to apply reflection to monitor students' learning process in this study. The results showed that students valued process management techniques such as reflective journals and reflective questions but they perceived them as uninteresting, overly simplistic, or lacking in diversity.

Study 2 (Chapter 4) was conducted to achieve SRO2. Based on the insights gained about students' mobile learning habits and preferences, we conducted a class experiment to explore the role and diversity of reflection in mobile-assisted language learning by integrating reflective activities into a mobile-assisted reading program and then investigating students' perception of the reading program, reflective practices, and the reflection modes adopted. A mixed research method was utilized involving the use of pretest/posttest, questionnaires and semi-structured interviews. In the experiment, students are required to read passages on mobile apps and then complete reading reflections and upload them onto online learning platforms. The students completed four reflections in four different modes in order: paper journal, e-journal, audio reflection, and collaborative reflection. Its findings revealed that learners generally considered mobile reading programs beneficial for their language learning process. The reflective practices adopted could stimulate their learning interest, promote understanding, and cultivate reflective and summarizing abilities without a heavy study load and inconvenient operation. Yet students didn't consider reflection a good way of process management and supervision. The most favoured journal modes were paper journal reflection and audio reflection, while collaborative reflection and e-journal reflection remained the least two favoured reflection modes.

Study 3(Chapter 5) was conducted to achieve SRO3. Inspired by Cowan's reflective diagram, we designed a reflective learning model for English reading supported by mobile technology. The proposed learning model was subsequently tested in a classroom experiment to assess its impact on students' learning outcomes. During the implementation phase, the insights obtained from Study 1 and Study 2 regarding learning preferences for mobile learning and reflection were utilized to design reflective activities or strategies for reflection. A comprehensive mixed research method was utilized involving the use of pretests/posttests, reflective journals, reflective writings, post reflection exercises, pre-questionnaires/post-questionnaires, and semi-structured interviews. Quantitative findings from tests and questionnaires indicated that the proposed learning model significantly influenced students' reading proficiency while showing no significant impact on their self-regulation and critical thinking skills. Nevertheless, qualitative findings from reflective journals, exercises, written assignments, and interviews demonstrated that the proposed learning model also

contributed to the enhancement of students' metacognitive self-regulation, reflective thinking skills, and deep thinking abilities

The study provides many practical implications. Based on students' perception of reflection and preferences for reflection mode in the mobile reading from **Study 2**, some implications were put forward concerning the application of reflective activities in app design and course design. For app developers, some preferable reflection modes facilitated with stimulative measures may be offered to cater to more learners to conduct reflective activities. For language teachers, based on the understanding of students' age, learning experience, and possible preferences, they may create a good reflective environment with technical and instructional support, and then provide two or three popular modes for students to reflect on whatever they read. Drawing upon the analysis of issues and suggestions identified in **Study 3**, several implications regarding the implementation of the reflective learning model were proposed, encompassing aspects such as conducting careful program design like suitable activities and proper timing, providing coaching, guidance, and scaffolding, promoting motivation from various perspectives, and creating more opportunities for collaboration.

This research contributes to the study of reflection and language education. It will provide theoretical support for individuals as they define and design reflective learning frameworks. The developed learning model can guide leaders, language instructors, and learners in managing and implementing reflection in specific language classrooms. It could also be applied to enhance learning in various domains or among students at different proficiency levels.

**Keywords:** reflective learning, model, language education, English reading, mobile technology

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# Chapter 1 Introduction

## 1.1 Research background

As higher education evolves from passive learning to greater student autonomy and active learning, more student-centred and experiential learning opportunities are created. This transition empowers students to assume increased responsibility and develop into self-directed learners(Chan & Lee, 2021). This transition also enables learners to enhance another fundamental skill they need to acquire: critical thinking skills (Betihavas et al. 2016). Critical thinking skills, recognized as essential 21st-century skills, are widely regarded as integral to the college education by numerous countries and organizations such as UNESCO, Europe, the USA, and Australia, among others (Kerruish, 2023). In many colleges students are encouraged to foster a lifelong learning attitude and capabilities, explore various ways of knowing and doing, and develop skills of critical thinking and metacognition essential for personal, intellectual, and professional development (Yeh et al., 2022). Reflection and mobile learning, as powerful tools to support active and self-directed learning as well as cognitive development, have received growing attention from both academia and learners in higher education.

Reflection is an essential part of the learning process. People learn not only through the active process of gaining experiences but also through the reflective process of regaining those experiences (Kessler, 2021). Reflection helps manage the learning process as well as promote learning performance (Chen et al., 2008). Researchers have explored the nature and function of reflection from various aspects. Dewey (1933) regarded reflection as an “active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusion to which it tends” in his experiential learning theories. David Kolb (1984) further developed Dewey’s theory and put forward an experiential learning model with four stages: (a) concrete experience (having the actual experience), (b) reflective observation (reflecting on the experience), (c) abstract thinking (learning from the experience), and (d) active experimentation or application (trying out what you have already learned).

Reflection is widely used in medical professions (Hwang et al., 2018; Murillo-Llorente *et al.*, 2021; Schwendimann *et al.*, 2018), teacher training(Kaplan *et al.*, 2007; Carter and Kurtts, 2019; Cornway et al., 2012), and education in various fields (Ahmed, 2020; Jaiswal *et al.*, 2021; Rhode and Brook, 2021; Zhang et al., 2011). In language acquisition, the reflective practice is believed to be a successful strategy for cultivating reflective and critical thinking, which are core skills required in the 21st century for problem-solving and decision-making. It can support students' metacognitive awareness in five domains: successes, target language linguistic features, the task,

strategies, and challenges (Kessler, 2021) and promote the reflective skills of the learners in classroom disorienting dilemmas (Carter and Kurtts, 2019). Reflective practices such as journal writing are also considered effective tools for monitoring learners' learning process. Students can monitor their metacognition growth in writing with reflective journal guidelines (Ramadhanti et al., 2020) and take responsibility for their own learning by monitoring their own learning process(Sidhu et al., 2010). In addition, reflection has also been proven effective in improving students' various language skills and performance. Researchers reported that reflective journals may help improve communication competence and reflective thinking (Shek et al., 2021), promote academic performance and organizational skills (Chang & Lin, 2014), and cultivate their writing abilities by allowing students to experience some learning moments such as engaging, surprising, challenging, perplexing, enlightening, and transferrable (Ahmed, 2020). From students' perspectives, reflective practices also influence students' satisfaction and preferences for instructional approaches (van der Loo et al., 2019).

Mobile technology and mobile learning have deeply permeated various domains of modern education. In the realm of higher education, the utilization of mobile learning has emerged as a prominent trend. Despite the challenge of learner distraction, mobile devices have been progressively integrated into education as an innovative solution to enhance learning experiences. The past few years have witnessed a significant surge in the growth of literature on mobile language learning. The findings of these studies generally reveal the positive impacts of mobile technology on language acquisition (Hawamdeh and Soykan, 2021).

Mobile technology plays a vital role in the modern reflective learning process. Features of mobile technology such as portability, individuality, social connectivity facilitate reflective learning by enabling learners to engage in personalized/collaborative reflection at convenience. Moreover, mobile learning integrated with reflection encourages learners to engage in self-assessment and promote metacognitive self-awareness and critical thinking. In addition, mobile technology can support reflection in all the stages of the learning process, allowing learners to engage in seamless learning and reflection anytime and anywhere.

However, despite the widespread acknowledgement of the effectiveness of reflective practices and mobile technology in language learning, certain issues persist in the existing literature regarding these two tools.

One problem concerns the domain of reflection study. In the realm of language education, reflective practices have been predominantly implemented in professional programs, enabling teachers and students to reflect on the teaching process or apply acquired knowledge in practical ways whereas implementation of reflective practices

for language skill improvement has been paid less attention (Loo & Sulankey, 2019). For the limited research conducted among language learners, a significant portion was devoted to the development of cognitive/metacognitive skills rather than language skills. Moreover, research is scarce concerning the enhancement of reading abilities in contrast to the attention given to skills like writing and speaking.

Another problem is related to the lack of comprehensive and systematic investigation into the reflection intervention effect. Many studies employ reflective practices as extracurricular activities rather than integrate them into the curricular design. This approach leads to a limited understanding of the role of reflection in the teaching and learning process. Moreover, despite the existence of numerous reflective theories and models, only a few studies have attempted to design a reflective model specifically to guide reflective learning in the whole language learning process(Kizilcik & Daloglu, 2018; Murugaiah & Thang, 2010).

Moreover, while the integration of reflection and mobile technology in language learning has proliferated in recent years, it frequently presents challenges for both learners and instructors(Cheng & Chau, 2009; Villamizar & Mej í a, 2019). Technology-aided reflection may not always be well received by learners compared with traditional reflection forms (Wang et al., 2023). Thus, it is imperative to explore suitable strategies or approaches for integrating mobile technology into the reflection process effectively.

Based on the existing literature gap, it is of necessity to establish a theoretical foundation for reflective learning in the context of English reading and to investigate effective implementation strategies within the learning process in a mobile learning context.

In addition, this research on reflective reading learning with mobile technology is also based on some considerations of personal understanding and preferences.

Firstly, in my understanding, engagement in reading supported with mobile technolgoy may benefit students' thinking skills and self-regulated learning skills as well as general language skill more effectively. Students in the 21st century are expected to enhance their language proficiency alongside developing critical thinking and self-directed learning abilities in the language classroom. I think the latter two, which can help them develop into innovative and creative thinkers and foster lifelong learning skills, are much more important than the cultivation of their professional skills-the language skills. That is why reflection and mobile technology were implemented in this research as they are key approaches for cultivating the two skills. Comparatively speaking, I think engagement in writing and reading will benefit students' thinking skills and self-regulated learning skills more than practising speaking and listening. Non-native

speakers tend to focus more on language accuracy and message transmission in speaking and listening activities rather than the deeper understanding of passages and regulation of their learning. However, the implementation of reflection in writing is widely investigated and some effective strategies have been already proposed to promote reflection in writing classrooms. However, research focusing on reading skills facilitated with reflection is rather limited, especially with the use of mobile technology. Therefore, I determined to investigate the implementation of reflection in reading with mobile technology. In Addition, I think in reflective reading practice, students can practice multiple skills such as reading, writing, speaking and listening with the abundance of online reading resources. But in reflective practice for others, often one or two skills are exercised in the reflective learning process. So, implementing reflection in reading practices will benefit the improvement of general language skills for learners.

Secondly, it is my preference for reading as a result of being an English reading teacher for years. I have been teaching intensive reading and extensive reading for years and acquired abundant experiences in reading teaching. Also, I am interested in the utilization of technology in the classroom and wish to comprehensively cultivate students' various skills by introducing mobile learning into their daily study.

### 1.2 Research objectives

This study's main research objective (MRO) is to design a reflective learning model for English reading supported by mobile technology to improve students' reading proficiency, self-regulated learning, and critical thinking skills.

This research outlines three specific sub-objectives (SRO), detailed as follows:
SRO1--To explore students' learning habits and perception of mobile learning in English reading learning. SRO1 will be achieved by pursuing two specific research objectives
SRO1_1: to investigate students' mobile learning habits.
SRO1_2: to explore stduents' perception of mobile English learning.

SRO2--To investigate students' perception of reflective practices and preferences for reflection modes in mobile English reading. SRO2 will be achieved by pursuing three specific research objectives.
SRO2_1: to investigate students' perception of the reflective practices.
SRO2_2: to investigate students' preferences for reflection modes.
SRO2_2: to explore the effect of the proposed mobile-assisted reading program facilitated with reflection upon students' language performance.

SRO3--To design a reflective learning model for English reading supported by mobile technology and examine the effectiveness of the proposed learning model in improving students' reading proficiency, self-regulated learning, and critical thinking skills. SRO3 will be achieved by pursuing two specific research objectives as well.
SRO3_1: To design a reflective reading learning model
SRO3_2: to test the effectiveness of the proposed learning model upon students' learning gains

The three sub-objectives (SROs) are intricately intertwined. Accomplishing SRO1 will provide insights into the perception and methodology of mobile learning implementation while achieving SRO2 will clarify the significance of reflection and learners' preferences for it in their learning process. The fulfilment of SRO1 and SRO2 will furnish valuable insights for crafting a novel learning model aimed at enhancing students' learning gains and experiences, thereby driving the accomplishment of SRO3. The fulfilment of these three sub-research objectives will lead to the accomplishment of the main research objective (Figure 1-1).

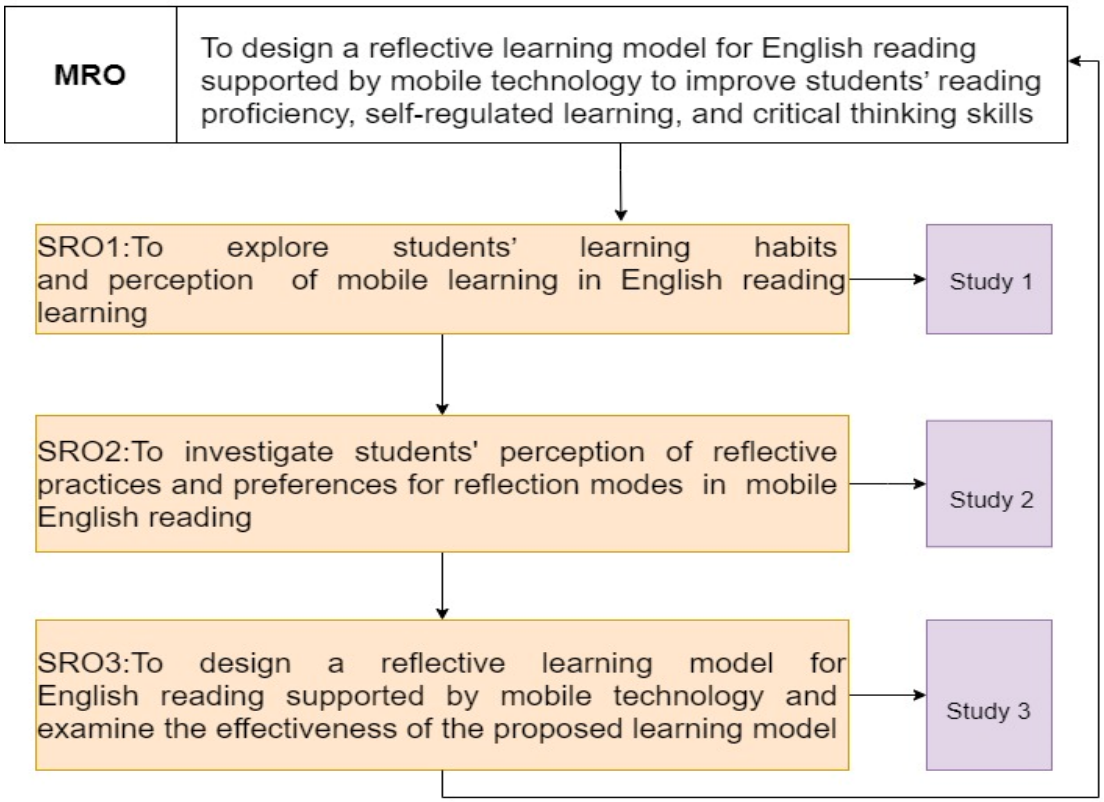



**Figure 1-1. The relationship between research objectives and studies**

### 1.3 Research significances

Reflection and mobile technology are two prevailing approaches for language education, but not much research tries to understand how reflection can be integrated into language learning, esp English reading learning, via mobile technology. The

current research centres on the significance of reflection in English reading facilitated by mobile technology and its practical implementation in language classrooms. Its design aims to address challenges in both theoretical comprehension and practical implementation.

The study initially confirmed learners' positive perception toward mobile-assisted language learning and reflective practices. Moreover, it investigated learners' preferences concerning various influencing factors, such as reflective modes and types of materials. Based on the understanding of the two, this research developed a theoretical reflective learning model for English reading via mobile technology and conducted a class experiment to examine its impact on learning outcomes. The benefits as well as challenges of reflective learning were identified and possible solutions are proposed.

The reflective model developed in this study will offer policymakers, education providers, language instructors, and language learners managerial and implementation implications regarding reflection. it will allow policymakers or education providers to consider, at a higher level, whether and how to integrate reflection into their language classrooms. It will provide language instructors insights into how to initiate and implement reflection through detailed activities. It will provide language learners with theoretical understanding and practical knowledge as to how to conduct reflection in their learning process to promote their language skills, cognitive skills, and self-regulated learning.

This research employed a comprehensive mixed-method approach to thoroughly investigate the influence of reflection on English reading learning. This methodology could be beneficial for researchers conducting studies in other language areas or disciplines. The developed learning model could also be applied to enhance learning in various domains or among students at different proficiency levels.

### 1.4 Structure of the thesis

The structure of this dissertation is organized as follows:

Chapter 1 presents an overview of the Doctoral dissertation, which includes the research background, the research objectives, the significance, and the structure of the study.

Chapter 2 (Literature Review) presents the theoretical background of the study based on the existing literature on education theories, mobile technology, English reading, and reflective learning. In addition, a critical review of existing literature was undertaken to explore the research gap concerning reflection in language learning.

Chapter 3 (Research Methodology) outlines the mixed methods design used in this study. Details of the research design, process, data collection, and analysis procedures are provided in this chapter.

Chapter 4 (Study 1) outlines a classroom action research to explore how to incorporate self-paced smartphone-assisted reading into the language learning process and how students perceived the effectiveness of this program. Details of the research design, method and data analysis, findings, and discussion analysis are provided in this chapter. The findings in this study serve as a reference for Study 2 and Study 3.

Chapter 5 (Study 2) presents the design of a mobile reading program facilitated by reflection to investigate students' perceptions of and preferences for reflection modes. Details of the research design, method and data analysis, findings, and discussion analysis are provided in this chapter. The finding of this study regarding reflection preferences is utilized in Study 3.

Chapter 6 (Study 3) introduces the design of a reflective learning model for English reading supported by mobile technology as well as its implementation in an English classroom. Details of the research design, method and data analysis, findings, and discussion analysis are provided in this chapter. Some pedagogical implications for future reflective learning and teaching in English classrooms were also provided in this chapter.

Chapter 7 (conclusion) summarizes the findings of studies 1, 2, and 3. It also provides an overview of the study's contributions. Finally, it states the limitations of this study and suggests some future research directions. Figure 1-2 showed the structure of the thesis in detail.

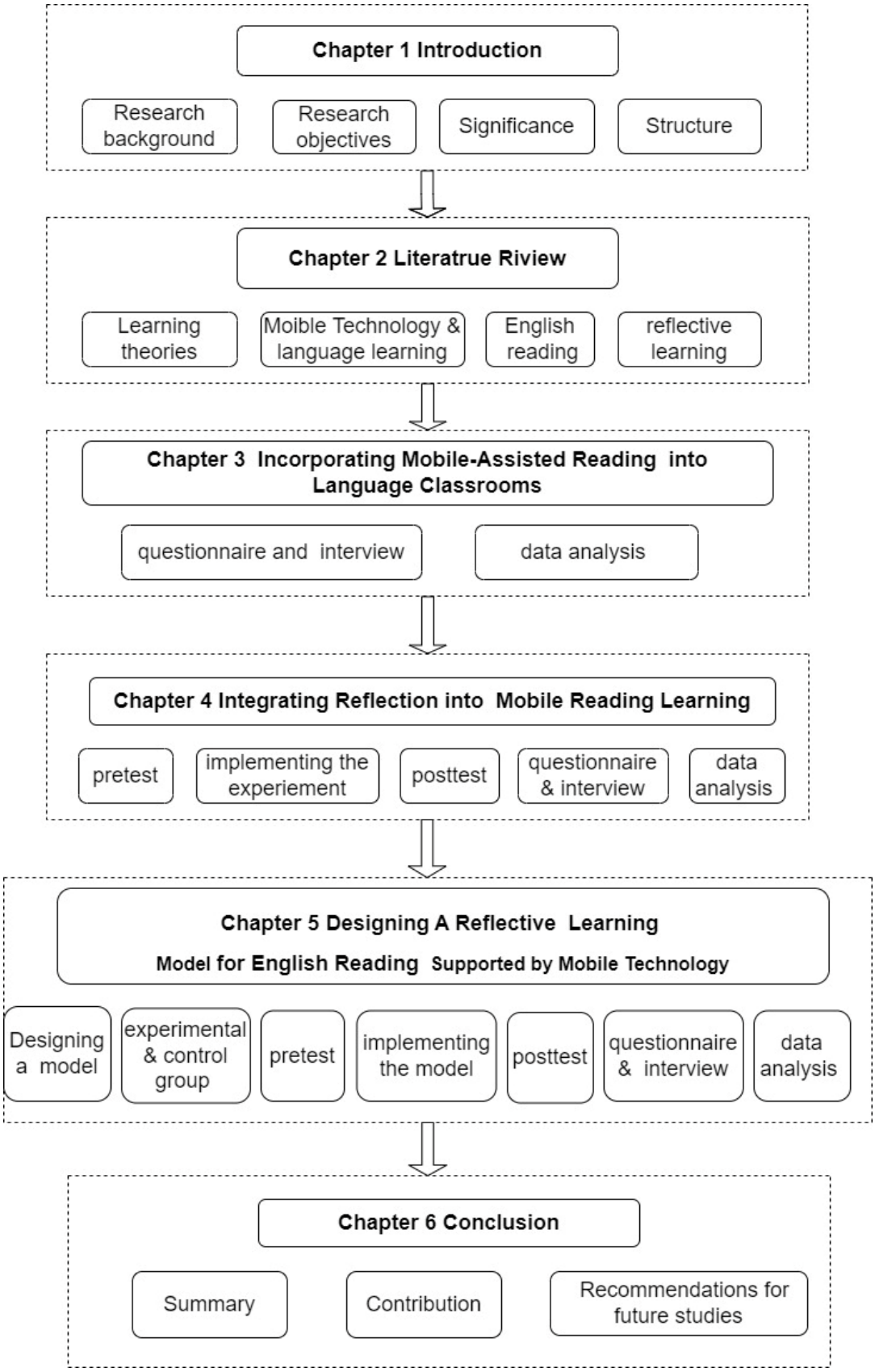



**Figure 1-2. Structure of the thesis**

# Chapter 2 Literature review

This chapter is dedicated to a comprehensive examination of the current literature relevant to the present study, focusing on four key aspects. The initial segment introduces two prominent theories in education: constructivism theory and metacognitive learning theory. Following that, the second segment introduces mobile technology and its influence on language education. The third segment explores major theories concerning English reading learning. Finally, the fourth segment provides an in-depth review of major theories of reflection and their application in language education. The research gap in the current literature is also highlighted in this segment.

## 2.1 Education theories of learning

This section will introduce some key theoretical frameworks underpinning reflective learning and reading acquisition, namely, constructivist theory and metacognitive learning theory.

### 2.1.1 Constructivist theory

One of the most foundational theories in education is the constructivist theory, which asserts that learners actively construct their knowledge(Confrey, 1990; von Glasersfeld, 1990). In essence, it is a theory about how people learn.

The most fundamental belief that nearly all constructivists agree on is that learners actively construct their own knowledge. This belief differs from the traditional notion that learners acquire knowledge passively through the transmission of information from teachers or textbooks. A second fundamental principle of constructivist theory is that learners acquire knowledge by bringing and integrating what they have experienced and learned into new learning situations (Brooks & Brooks, 1999). This cognitive reflection process will influence how learners approach and engage with the new knowledge. Another related belief within constructivist theory concerns the adaptability of learning suggesting that when new knowledge or experiences cannot be easily integrated into existing knowledge systems or cognitive structures, then learners will modify and adapt them to achieve better alignment. This perspective views knowledge as dynamic rather than stable, as it evolves through the interaction of learners' existing knowledge with new information(Confrey, 1990).

Throughout the 20-year study, numerous theories have been proposed under the umbrella term of constructivism. In this section, the researcher will introduce the three most influential theories of constructivism to assist readers in clarifying their understanding of this concept—cognitive constructivism, social constructivism and radical constructivism.

● Cognitive constructivism, a foundational theory in developmental psychology, was pioneered by the eminent Swiss psychologist Jean Piaget. This theory also falls within

the domain of personal constructivism. In his extensive research on children's mathematics education, Piaget observed that children's own actions played a crucial role in cognitive development. He believed that what matters more in the learning process is their isolated intellectual and cognitive development rather than the social context (Das Gupta & Richardson, 2001). As a result, this theory downplays the significance of social and cultural factors in the learning process. In addition, cognitive constructivism also emphasizes the adaptation or assimilation of knowledge. Students will construct and acquire knowledge individually by adapting to the environment (Kamii, 1984). When encountering new information, learners typically filter and modify it through their existing knowledge. This suggests that in education, particularly among children, understanding cannot be imposed; instead, it should be gradually developed by learners themselves as they actively utilize what they learn to comprehend the world (Baroody & Ginsburg, 1990).

- Radical constructivism was built on the foundational work of Piaget and other cognitivists, as well as the contributions of empiricists such as Locke, Berkeley, and Giambattista Vico (von Glasersfeld, 2013). The term was proposed by Ernst von Glasersfeld to distinguish his constructivist theory from previous theories. There are two principles in the theory: (1) *"knowledge is not passively received but built up by the cognizing subjects"*; (2) *"the function of cognition is adaptive and serves the organization of the experimental world, not the discovery of ontological reality"* (2013, p 18). The first principle emphasizes the active role of learners in the learning process. The second principle, however, distinguishes this theory from others in that it views knowledge not as the truth, but as a subjective cognition a person has to make sense of his experiences and the outside world.

Radical constructivists believe the learning process involves self-regulating and constructing conceptual structures acquired through reflection and abstraction. If learners wish to solve their problems, they must first perceive them as their own problems and as an obstacle hindering their progress toward an objective. Von Glasersfeld indicated that knowledge should be relevant to learners' interests. Teachers can create learning environments where children can act upon their ideas, and then discover the parts that lead to problems and need revision (von Glasersfeld, 1994).

- Social constructivism

This theory focuses on the role of society, culture and history in one's learning. It was pioneered by Vygotsky, a Russian social scientist, who offered part of the key framework in this field. In his theory, there are three main themes: (1) human mental functioning can only be fully understood by considering social factors such as origin and history. (2) higher human mental functioning tends to have social origins and a "quasi-social" nature. (3) higher human mental functioning is mediated by tools and signs, collectively termed semiotics (Wertsch, 1988).

Social constructivists emphasize the study of the mind's social development. They believe higher mental functions such as thinking, reasoning, and understanding are cultivated through interactions with others in social contexts (Bredo, 1997). Therefore, in their view, learners co-construct knowledge together when they participate in group work. Also, almost all learning, esp higher mental function learnings, occur in social-cultural contexts. Furthermore, language, as one of the primary tools for conducting thinking, plays a crucial role in the process of knowledge construction (Taylor & Campbell-Williams, 1992).

### 2.1.2 Metacognitive learning theory

Metacognition has evolved into one of the most significant areas in cognitive developmental research since its emergence in the 1970s. It is a fundamental factor influencing not only second language learning but also overall learning (Flavell, 1976).

John Flavell is widely regarded as the father of metacognition, as he initiated the study in this field and was the first to introduce the term. He defined it as *"one's knowledge concerning one's own cognitive processes and products or anything related to them, e.g., the learning-relevant properties of information or data"* (Flavell, 1976, p232). Based on his definition, many scholars come up with their own understanding of metacognition. For example, Bonds, Bonds and Peach (1992) gave a more detailed definition by referring to metacognition as "*the knowledge and awareness of one's cognitive processes and the ability to regulate, evaluate, and monitor one's thinking*" (p.56).

Apart from defining the term, Flavell further decomposed metacognition into two constituents.: metacognitive knowledge and metacognitive experiences. Metacognitive knowledge refers to one's beliefs or knowledge about people, tasks, goals, behaviours, and experiences. Flavell (1979) placed a significant emphasis on metacognitive knowledge and further divided it into three categories: person, task, and strategy. Metacognitive experiences refer to experiences that aid learners in acquiring knowledge, or that guarantee the occurrence of regulation. Based on the distinction of the two constituents of metacognition, Flavell proposed a model of cognitive monitoring, which is one of the most extensively used models in the field. The model is composed of four subcategories: metacognitive knowledge, metacognitive experiences, goals/tasks, and actions/strategies (as shown in Figure 2-1). The goals/tasks are related to the objectives of a cognitive effort, while the actions/strategies refer to the ways or techniques that help individuals reach their goals.

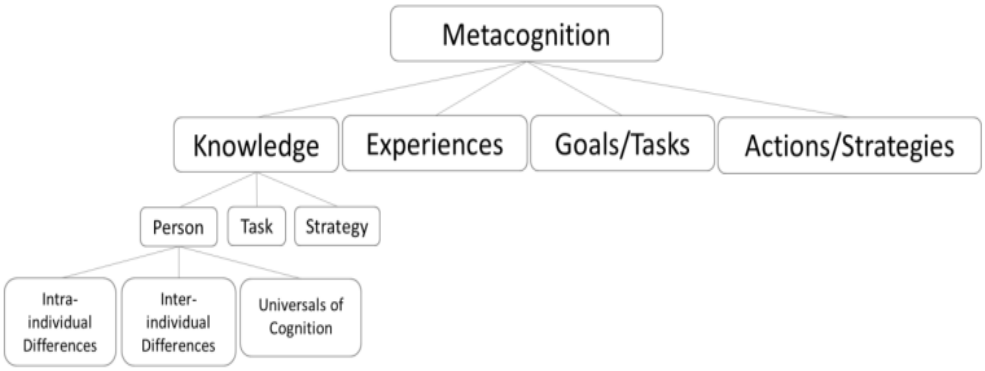



**Figure 2-1. Flavell's (1979) model of metacognition**

As Flavell's primary focus was on metacognitive knowledge, the other categories were discussed to a lesser extent in his model. Brown (1987) formulated a metacognition model with two subcategories, which emphasized how learners tackle problems with strategies (Figure 2-2). Brown's model comprised two subcategories: knowledge of cognition and regulation of cognition. The former involves the awareness of cognitive processes used to control intellectual processes and was divided into three sub-parts: declarative knowledge, procedural knowledge, and conditional knowledge. The latter was defined as activities that help learners organize and control their learning or thinking and involve three metacognitive strategies: planning, monitoring, and evaluation strategies. This model is influential in that it conceptualizes the regulation of cognition, inspiring much subsequent research in this field.

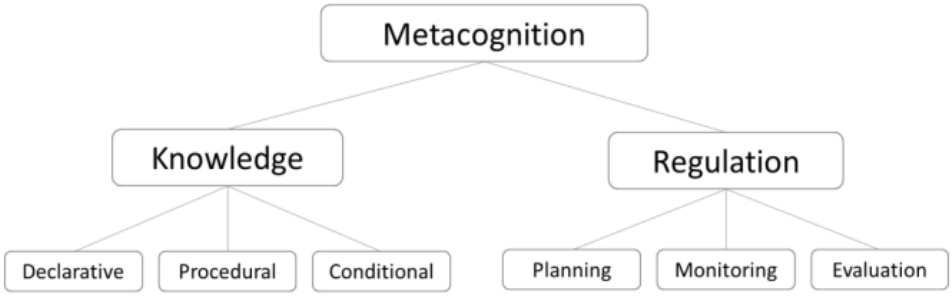



**Figure 2-2. Brown's model of metacognition**

## 2.2 Mobile language learning

### 2.2.1 Mobile technology and mobile learning

Mobile technologies have deeply permeated various facets of modern society. It has transformed how we communicate, access information, entertain ourselves, and even conduct business, with various mobile devices such as smartphones, tablets, wearables like smartwatches, and various other gadgets that facilitate wireless communication technologies (Persson & Nouri, 2018). The adoption of mobile devices isn't restricted by time or location, making them increasingly appealing to a broader audience,

irrespective of age.

In the realm of education, the utilization of mobile technologies has emerged as a prominent trend. Despite the challenge of learner distraction, mobile devices have been progressively integrated into education as an innovative solution to enhance learning experiences. Two key motivations fuel the increasing interest in mobile learning. One stems from recognizing that mobile devices can offer learners a more personalized and tailored learning experience, thereby enhancing learning effectiveness. The second motivation arises from an increasing awareness of the importance of lifelong learning in the 21st century (Sharples & Pea, 2014).

Mobile learning is often characterized as accessible "anywhere, anytime" (Geddes, 2004) and is primarily distinguished by the predominant use of handheld or palmtop devices as the key tools (Traxler, 2005). The adoption of devices such as smartphones and tablets, known for their lightweight, compact size, and user-friendly interface compared to computers and laptops, has transformed traditional teaching and learning methods (Rogers et al., 2009). This evolution is characterized by a shift towards a more learner-centred and self-regulated approach. Digital learning resources supported by mobile technologies not only facilitate classroom activities and provide students with independent learning opportunities but also have the potential to enhance learning interest and increase students' participation, as noted by Hawamdeh & Soykan (2021).

### 2.2.2 Mobile-assisted language learning

In the field of language education, Mobile technology is also called Mobile-assisted Language Learning (MALL). MALL originates from mobile learning (mLearning) and can be seen as a specialization of that field. Kukulska-Hulme et al (2015) define Mobile assisted language learning (MALL) as *"an increasing area of research with the development of mobile applications specially dedicated to language learning and the growing perception of the importance of acquiring multiple languages in an interconnected world"*. MALL often employs technological devices such as smartphones, PDAs, and iPods to facilitate language learning and Laptops are today typically not considered mobile in many contexts (Chinnery, 2006).

The fundamental attributes of mobile technology, including portability, individuality, social connectivity, and context sensitivity, have been widely integrated into language learning practices (Chinnery, 2006). With the support of mobile technology, learners can conveniently access learning resources continuously and engage in language learning anytime and anywhere using applications such as language learning apps, Moodle systems, or YouTube, as noted by Sung et al. (2015). Learners can also engage in a personalized and customized language learning process tailored to their individual needs and interests. Learners may also communicate, collaborate, or share with other language learners, either synchronously or asynchronously, using social media tools

such as Skype, Zoom, or Facebook, as observed by Lan et al. (2007). Learners can also seamlessly integrate what they have learned with real-life and cultural contexts using mobile technology (Chen & Li, 2010).

The past few years have witnessed a significant surge in the growth of literature on mobile language learning. A substantial number of studies have been conducted to explore the impact of Mobile Technology (MT) on learning and teaching foreign languages globally. The findings of these studies generally reveal the positive impacts of mobile technology on language acquisition (Hawamdeh & Soykan, 2021). Mobile technology is undoubtedly set to play an increasingly significant role in the language teaching and learning process.

### 2.3. English reading

Reading is not only one of the most challenging activities but also a skill that every EFL (English as a foreign language) learner must engage in and master (Salari & Hosseini, 2019). Undoubtedly, this crucial skill significantly supports students in their academic pursuits and their overall lives (Dechant, 1991).

For years, numerous researchers have extensively studied effective methods for teaching and learning reading. Thus far, three primary theories have been developed to explain the nature of learning to read: the traditional approach (bottom-up processing), the cognitive view (top-down processing and interactive model) and the metacognitive view ( Pardede, 2008).

#### 2.3.1. The traditional approach (bottom-up processing)

This approach to reading was shaped by the behaviourist psychology of the 1950s. According to behaviourism, learning is acquired through the establishment of habits via drills, repetition, and error correction (Hadley & Reiken, 1993).

This approach was associated directly with the bottom-up approach to reading， which prevailed from around 1950 to 1965 (Alexander & Fox 2008). In this model, reading is perceived as a linear process in which readers decode texts word by word, then link these words into phrases, and subsequently construct sentences from those phrases. In other words, reading involves synthesizing the meanings of words to understand the meaning of clauses and sentences. Readers understand the author's message by decoding texts and extracting meaning from printed symbols. This approach is linked with the "phonics" approach to reading instruction, in which meaning is attained by translating lower-level language symbols into higher-level ones, progressing from letters to sounds and then to meaning(Alexander & Fox, 2008).

Another aspect of this approach is that reading is often perceived as a passive process,

wherein readers passively receive information from the reading process without necessarily influencing it (Urquhart & Weir 1998 ). In other words, readers' task was to identify letters, convert them into phonemes, words, and ultimately into meaning. Readers are perceived as passive receivers of the author's meaning, which resides in the text and awaits reproduction by the readers.

Reading learning and teaching were heavily influenced by this approach before the 1970s. Reading exercises are designed to emphasize the literal understanding of sentences or texts, often paying little attention to the reader's own experience or knowledge of the subject. Most activities are geared towards understanding the meaning of lexical and grammatical forms within the texts. As a result, this approach was widely criticized for its excessive emphasis on language features such as words and structure. Eskey(1998) argued that this approach failed to explain the contribution of the reader's knowledge and expectation in comprehension. Niven (2005) suggested that, under this approach, students may become focused on sounds rather than meaning, potentially shifting towards a sound-centric learning style.

### 2.3.2 The cognitive view (top-down processing and interactive processing)

With the development of cognitive psychology, understanding of reading presents several new perspectives. The cognitive sciences provided new explanatory power regarding how humans learn their first language as well as second or foreign languages.

This approach views reading as a cognitive process that emphasizes understanding written language and places significant importance on context. It is confirmed by the top-down approach to reading, which gained prominence between 1966 to 1975 (Alexander & Fox 2008). Readers not merely decode and extract information from the text, but also engage in a process in which "the reading activates a range of knowledge in the reader's mind that he or she uses, and that in turn, may be refined and extended by the new information supplied by the text" (Grabe, 1998, p. 56). In this approach, readers no longer engage in passive reading activities; rather, they are involved in purposeful and rational activities that depend on the reader's prior knowledge and expectations of the text. They actively make sense of the written language in the text instead of only decoding the print text (Smith, 1994). They will integrate the text into the cultural, syntactic, linguistic, and historical knowledge they have acquired and subsequently refer back to this knowledge when encountering new or unexpected information. Readers, who bring a wealth of knowledge, expectations, assumptions and questions to the text will continue to read so long as the text aligns with their prior expectations (Goodman, 1982).

An essential theory associated with this approach is Schema Theory, which explains how background knowledge influences comprehension. According to this theory, we draw from our prior understanding of the real world and then organize the knowledge

we acquire into interconnected patterns called schemas in our minds. When encountering new experiences or texts, we activate relevant schemas to aid comprehension and make predictions (Nunan 1991). Wilson & Anderson (1986) stated the importance of schemas as “a reader comprehends a message when she can activate or construct a schema that gives a good account of the objects and events described”.

However, this approach has received criticism because meaning is not solely derived from the text itself (Dechant, 1991). Rayner & Pollatsek (1989) also contend that the degree to which readers conduct expectation or guessing appears to have a limited impact on the reading process. Therefore, an interactive approach to reading was developed, which combines the top-down model and the bottom-up model to address some of the shortcomings of both.

In the interactive approach, the fundamental concept is that all processes in the bottom-up and top-down approaches interact. The interactive model is founded on the notion that readers synthesize useful ideas from the bottom-up process and integrate them with the main ideas obtained from the top-down process (Grabe & Stoller, 2002). According to Hedge (2000), the term "interactive" has two senses. The first sense refers to the relationship established between the reader and the text during the process of understanding. The second sense refers to the interaction among the diverse types of knowledge that readers utilize to understand the text.

This theory has been embraced by many scholars, and several reading models have been developed based on it, including the interactive-activation model (Rumelhart, 1980) and the interactive-compensatory model (Stanovich, 1980), with the latter considered a classic illustration of an interactive mode. This model holds that readers can compensate for deficiencies at one level of processing by accessing knowledge from higher or lower levels of processing. For example, if readers have problems at the linguistic level, such as word recognition or grammatical structure, then they may try to understand them by utilizing a higher level of knowledge such as background knowledge. It is noted that learners of English as a Foreign Language (EFL) frequently utilize high-level processing, such as contextual or background knowledge, to address issues with low-level processing, such as vocabulary or grammar difficulties (Alderson 2000; Grabe & Stoller, 2002).

### 2.3.3 The Metacognitive view

The concept of metacognition refers to readers’ capacity to plan, self-monitor, and self-evaluate their understanding during the reading process (Grabe & Stoller, 2002; Takallou, 2010). According to this view, learners will employ a set of flexible and adaptable strategies to comprehend the text and monitor their understanding process. Learners exercise their control over the text understanding through those strategies, which are collectively known are metacognition( Block, 1992; Dole et al., 1991).

Compared with other reading theories, the metacognitive approach includes an additional component of monitoring. Learners engage in much self-regulated learning during the reading process, attempting to track and monitor their progress. Many cognitive strategies will be involved such as hypothesis, inference, prediction, summary, and conclusion, etc (Urquhart & Weir 1998). These strategies can be categorized into three primary headings: planning, monitoring, and evaluation (Baker & Brown, 1984). In the initial stage of *planning*, readers will determine what they intend to learn prior to beginning the text. Strategies such as goal-setting, reviewing, and adjusting reading speed will be employed. In the second stage of monitoring, readers will read according to their plan and continuously monitor their reading process, verifying the accuracy of their inferences and predictions. They will employ various reading strategies aimed at achieving a deeper understanding of the text. For example, they may use dictionaries, take notes, locate the topic sentence, identify supporting details, discern the author's purpose, connect previous knowledge to comprehension, determine their approach to reading, and make predictions. Those activities help enhance metacognitive skills such as comparison and contrast, determining cause and effect, making inferences, etc. In the third stage of evaluation, students assess their reading activities, which includes identifying useful strategies for future learning, addressing encountered problems, and recognizing achievements. They will employ strategies such as summarizing, drawing conclusions, or making inferences based on the text they have read.

## 2.4 Reflective learning

### 2.4.1 Reflection

The concept of reflection was initially explored as a philosophical principle by early researchers such as John Locke and Baruch Spinoza in the field. Locke regarded Reflection as the introspection of the mind to obtain concepts. In this introspective self-examination, the mind obtains concepts different from those obtained through sensation (Scharp, 2008). Spinoza viewed the activity of thinking as “ideas of idea” or reflective knowledge, which means an idea is the result of cognition as well as the object of his conscious cognition. He considers reflection as a process of rethinking the formation of knowledge as an idea and reexamining conceptual activities. According to him, adequate ideas naturally emerge with reflective knowledge (Primus, 2021).

Contemporary reflection developed as a construct in education in America. American educator and philosopher John Dewey was regarded by many scholars as the father of reflection. His book *How We Think* (1910, 1933) has been considered a foundational starting point for both discussing reflection and conducting systematic studies on the topic. In this book he first proposed a clear definition of reflective thinking and defined it as *“Active, persistent and careful consideration of any belief or supposed form of knowledge in the light of grounds that support it and the further conclusion to which it*

*tends to constitute reflective thought…it includes a conscious and voluntary effort to establish belief upon a firm basis of evidence and rationality"* (Dewey, 1933:33). According to Dewey, reflection is inherently a cognitive process influenced by various contextual factors such as emotions, attitudes, and environment. Additionally, as a pioneer of the pragmatist school, Dewey described reflection based on its purpose and within a broader context (Nguyen et al., 2014). Inspired by his work, numerous scholars have delved into the concept of reflection, endeavouring to explore it from various perspectives.

Habermas is another founding figure in the realm of reflection. He exhibited interest in the reflection's role within critical theory and focused on its function at social levels. In his book *Knowledge and Human Interest (1971),* He introduced the concept of "knowledge-constitutive interests" that humans choose to adopt or are motivated to generate, which he believes guide and shape human knowledge. As a result, the scientific method may not fully satisfy people's quest for the ideal approach to explore and explain the fundamental sources of knowledge. At this time, self-reflection will become the means to make people see the link between knowledge and related human knowledge. Self-reflection emerges as an essential tool in the learning process.

### 2.4.2 Reflective learning

Literature on reflective learning has been extensively investigated across a multitude of disciplines over the past 30 years, including education, medical training, and social work. There is no consensus on a definitive concept of reflective learning or the original proposer of the concept. Different scholars use various terms, including reflective learning, reflective practices, or simply reflection, to describe the learning process of reflecting on past experiences.

Donald Schön was one of the key scholars in the study of reflective learning, credited with introducing reflection to the field of professional education. Consequently, the concepts of reflective teaching and reflective learning have evolved gradually over time. However, Schön did not use the term reflective learning nor provide a definition for reflection or reflective learning. Instead, he coined the phrase *reflective practices.* In his book *The Reflective Practitioner(1983)*, he introduced a distinct categorization of reflection, distinguishing between reflection-in-action and reflection-on-action based on the context and timing of the reflective process. To Schön, reflection-in-action is the type of knowledge we demonstrate through our intelligent actions that happen during the action and serves a critical function by questioning the underlying assumptions of knowing-in-action, prompting us to think critically about the thought processes that led to a particular situation or opportunity. Reflection-on-action, however, occurs after the event, intertwining both thought and action. Schön maintained that reflection, as an intuitive and non-rational personal activity, involves the ability to think and make decisions about how to act while engaged in a task.

Schön stood out as the most frequently cited author in professional research. On one hand, he wrote extensively and sparked interest in the implementation of reflection in professional domains. On the other hand, he strongly advocated for and demonstrated the value of experiential knowledge over theoretical frameworks in the professional arena. Moreover, his differentiation between reflection-in-action and reflection-on-action aids educators in gaining a deeper understanding of reflection and in organizing effective reflective practices (Nguyen et al., 2014).

Kolb (1984) likewise did not use the term "reflective learning," nor did he provide a definition or describe the structure of reflection. Instead, he employed the term "experiential learning" to describe the process in which reflection is applied within a learning context. He defined it as "*the process whereby knowledge is created through the transformation of experience*" (p. 38). Kolbe built a theory of experimental learning and developed an experimental cycle with four stages. Unlike Schön's concept where theory was separated from experience, Kolb's model attempts to bridge theory with experience by incorporating reflection as the critical intermediary between different stages. Consequently, although Kolb's theory may not have introduced a novel understanding or definition, reflection did assume a fresh role and significance in enhancing experiential learning following his research. His model also offers guidelines for implementing reflection in real learning scenarios. Kolb is one of the most cited scholars in this field.

The aforementioned scholars—Dewey, Habermas, Kolb, and Schön—establish the theoretical framework for the existing literature on reflection. The first two explore the philosophical and epistemological aspects of reflective learning while the latter two examine reflection within the realms of experiential learning and professional development (Moon, 1999).

Inspired by Kolb's experimental theory, Bond et al. (1985) defined "*reflection in the context of learning"* as a *"generic term for those intellectual and affective activities in which individuals engage to explore their experiences to lead to new understandings and appreciations"* (p. 9). Bond et al. diverged from Kolb by devising a model for reflective progress that outlines how reflection intervenes to transform experience into learning. Their definition and model not only enhance the understanding of reflection but also contribute to emphasizing the affective dimensions within reflection.

Moon (1999), in her analysis of reflection learning and professional development, sees reflection as *"a basic mental process with either a purpose or an outcome or both, that is applied in situations where material is illstructured or uncertain and where there is no obvious solution" (p. 10)*. Moon carefully examined the similarities and differences in the preceding stages of reflection conceptualization before developing her own

conceptualization. Furthermore, she was intrigued by the pedagogical applications of reflection and acknowledged the potential close association between reflection and representations of learning. Moon's contribution lies in her enhancement of our understanding of reflection through detailed clarification of the conditions necessary for fostering reflection and its potential outcomes. Furthermore, as an educator, her inquiries, questions, and models regarding the operation of reflection assist in the practical application of reflection within real-life contexts.

Some other scholars also proposed their unique understanding of reflective learning as follows:
"*Reflective learning is the process of internally examining an issue of concern, triggered by an experience, which creates and clarifies meaning in terms of self, and which results in a changed conceptual perspective"* (Boyd & Fales, 1983, p. 101).

Reflection is "*1. Awareness of uncomfortable feelings and thoughts; 2. Critical analysis of feelings and knowledge; 3. New perspective.*" (Atkins and Murphy, 1993, p. 1188)

Reflection "*operates through a careful re-examination and evaluation of experience, beliefs and knowledge*" and "l*eads to new perspectives*"(Kember, 2008, p. 370)

"*A metacognitive process that occurs before, during and after situations with the purpose of developing greater understanding of both the self and the situation so that future encounters with the situation are informed from previous encounters.*" (Sandars 2009, p. 685)

The varying definitions and terminologies chosen may stem from different purposes or frameworks. However, at its core, reflection is fundamentally a cognitive process, and these diverse definitions and models often share many common characteristics just as Moon(1999) mentioned that the differences in the reflection literature do not arise from differences in the reflection process, but rather from the diverse applications and guiding framework which shape them. In this dissertation, the researcher favours the definition proposed by Boyd & Fales (1983), which defines reflective learning as "*the process of internally examining an issue of concern, prompted by an experience, leading to the creation and clarification of meaning in terms of self, and culminating in a changed conceptual perspective.*". The definition is clear and emphasizes key components of reflection, including the learner, the outcomes of reflection, and the cognitive process involved.

### 2.4.3 Reflective learning models

Numerous reflective learning models have been developed, drawing inspiration from Dewey's perspectives on reflection. In the following parts, some of the most recognized reflection models will be introduced.

(1) Kolb's model of the experiential learning cycle.
Kolb (1984) was among the pioneering authors to introduce a reflective learning model that achieved widespread recognition in the literature. He developed a four-stage experimental learning model as follows.

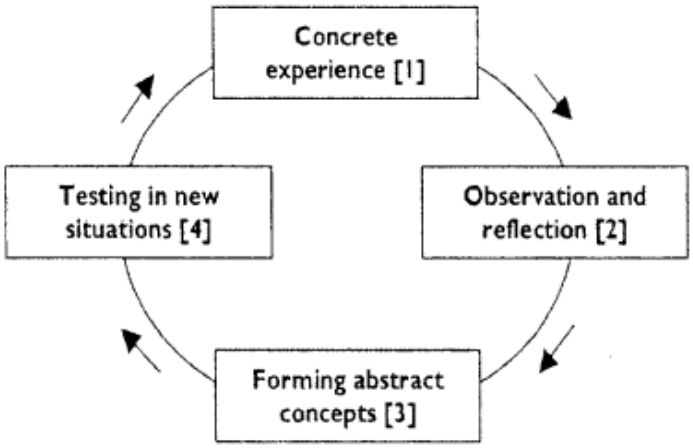



**Figure 2-3. Kolb's experiential learning cycle (1984)**

In the first stage *Concrete Experience*, learners engage in the activity and directly experience it; In the second stage *Observation and reflection*, learners engage in reflective analysis of their performance in the activity from different perspectives; In the third stage *Forming abstract concepts*, learners formulate generalizations from their experiences, which assist their transforming their observations into coherent theories or principles. In the last stage *Testing in new situations*, learners utilize their newly acquired knowledge or theory to guide planning for future learning experiences.

Kolb's model is one of the most popular models and is widely applied in the arena of higher education and adult education. The advantage of the model lies in the fact that it takes into account learning styles and individual preferences in learning (Kolb & Kolb, 2009).

However, it is not without criticism. According to Cowan (1998), Kolb (1984) does not reveal the very reflection process and elements in the reflection, leading to the inadequate discussion of the nature of the observation and reflection stage. Cowan (1998) also argues that the perpetual movement of Kolb's cycle is oppressive and misleading from the outset, making it difficult to identify.

(2) Gibbs' model of reflection
Gibbs (1988) develops a six-stage reflective cycle of learning, expanding the concept of reflection to encompass the entire learning process. In this cycle, learners can systematically reflect on their learning stages, activities, and experiences.


**Figure 2-4. Gibbs' reflective cycle of learning (1988)**

This Reflective Learning Cycle comprises six components:
1. Description: Recall and provide a detailed description of the events that occurred during the learning activity or experience.
2. Feelings: Identify the learner's emotions and responses to the experience.
3. Evaluation: Assess the positive and negative aspects of the experience, making value judgments
4. Analysis: Incorporate external experiences and research to assist in comprehending the situation.
5. Conclusions: Conclude the insights gained from the experience and analysis
6. Personal Action Plans: Determine the actions to be taken in future situations based on the lessons learned.

(3) Schön's model
Schön defines reflection in terms of action and categorized it into two types based on context and time: 'reflection-in-action' and 'reflection-on-action' (Schön, 1987).

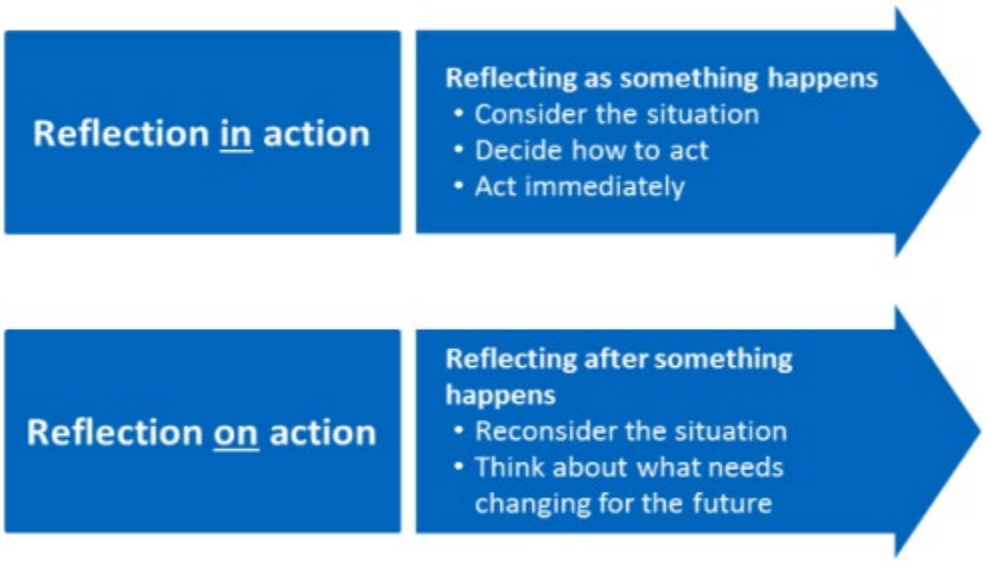



**Figure 2-5. Schön's model (1987)**

Reflection in action occurs during the action. During this stage, when confronted with challenges, we not only apply past experiences to the new situation but also reexamine and reflect on the problem. Subsequently, we adjust our actions based on our enhanced understanding of the situation. The learner may also develop a fresh perspective on the problem and draw new implications.

Reflection on action occurs after the action. Reflection on action entails the learner retrospectively examining the experience and constructing new understandings to guide future actions. reflection on action enables us to enhance our skills and knowledge, thereby preparing us for similar situations in the future.

Schön's model of reflection has inspired much work on reflection study ( Moon, 1999; Cowan, 1998). It underscores the importance of gaining new insights into events, which in turn serves as fuel for future reflection. However, there are also different voices. The most fundamental criticism is by Moon (1999) who argues that Schon's concept of reflection oversimplifies a complex process with simple terms.

(4) Cowan's model'
Cowan(1998) formulated a reflection diagram by integrating Schön's concepts of two reflection stages with the notion of reflection-for-reflection. This diagram is a substantiated practical model, which explains or at least predicts how learning in practice can take place and be influenced by it.

This diagram has been demonstrated to be a practical model in that it aids in explaining or predicting how learning in practice can occur and be influenced by reflection.

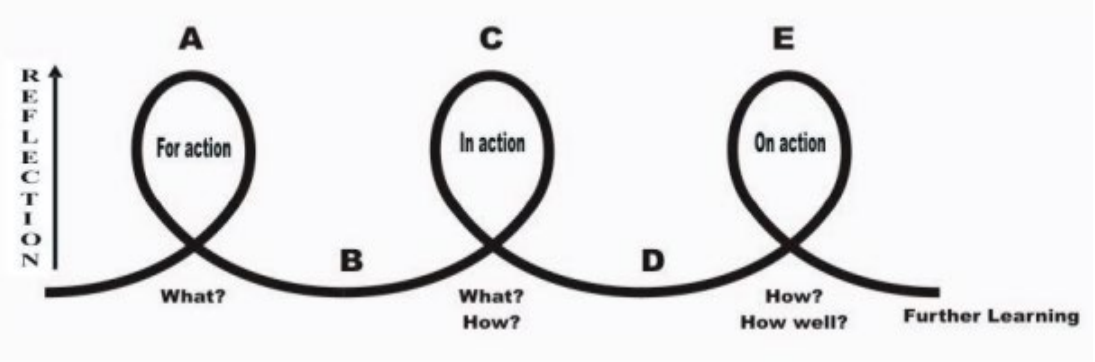



**Figure 2-6. Reflection diagram (Cowan, 1998)**

There are five stages in this reflection diagram. During the first stage *reflection for action* (see Figure 8, Loop A), learners are encouraged to analyze and reflect on their activity, which is well planned in the second stage (Loop B). learners will relate new experiences to theories or knowledge they acquired and apply them to perform a new activity. In the transitional third stage *reflection in action* (Loop C), Students engage in analytical reflection by addressing questions such as "How have I done it?" and "How could I do it differently?" Learners began to classify and generalize their various learning experiences in this stage such as gains, challenges, need for support, and limitations. In the next stage (Loop D) Teachers may furnish action-consolidating materials, which learners then utilize to plan and apply their ideas in practical learning experiences. This stage represents the pivotal moment of reflection, aligning with the cycle of abstract conceptualization in Kolb's (1984) model. Students are also encouraged to address and rectify any problems they have identified in their learning through self-reflection. In the fifth stage (Loop E), learners have the opportunity to apply their new knowledge in practical scenarios. They will reflect on what they have learned about the learning process and observe how their thinking has evolved as a result of reflection in other loops. They will identify, within this learning process, which aspects of learning need to be continued and which acquired knowledge should be applied to future learning endeavours. It is notable that the last loop of action is not closed but accessible. The change in the last loop will lead to the change in the reflection for action in the next sequence. Therefore, Cowan's diagram (1998) is depicted as open-ended and dynamic, in contrast to Kolb's (1984) model (Bubnys & Žydžiūnaitė, 2010).

(5) King's integration of experimental learning and reflection models

King (2002) argues that within the various stages of experiential learning, distinct types of reflection can be identified. Consequently, he synthesized the cycle of experiential learning and reflection models into a novel unified model.

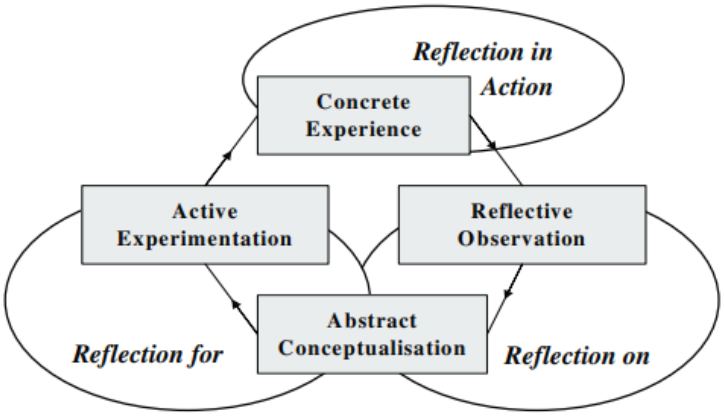



**Figure 2-7. Integration of experience learning and reflection models (King, 2002)**

(6) Boud model

Boud et al. (2005) emphasized that enhancing the interconnectedness between learning experiences and reflective activities is a key method to stimulate learning. Therefore they developed a three-component model which highlights the process of reflection on action, wherein experience is transformed into learning. The three components are experiences, reflective processes, and outcomes.

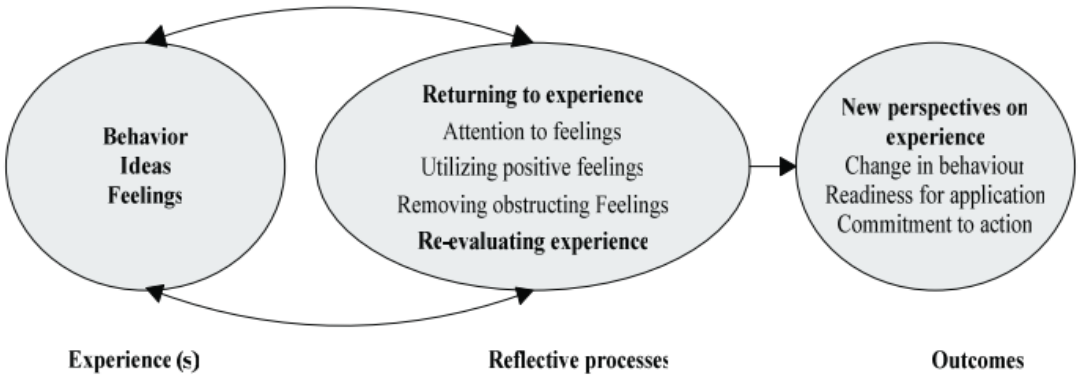



**Figure 2-8. Model of reflection learning (Boud et al., 2005)**

Boud's model is not characterized by a linear sequence; rather, it is an iterative process in which reflection and experience can cycle iteratively numerous times before yielding outcomes resulting from their reflection.

(7) John's model of structurized reflection

John (2004) devised a model consisting of numerous questions. This model aids learners in maintaining consistency throughout the reflection process and offers structured guidance for reflection.

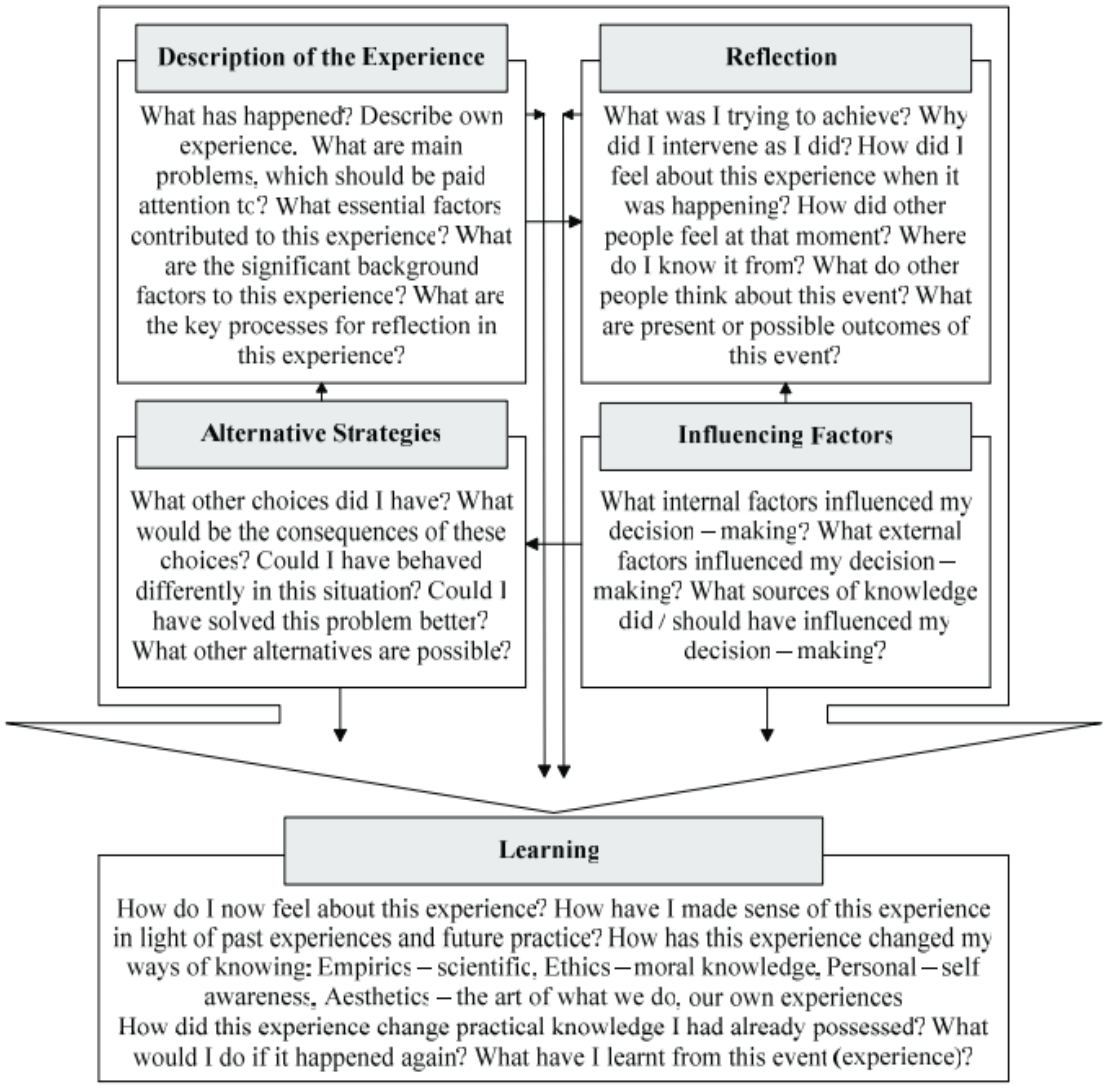



**Figure 2-9. Model of structurized reflection (Johns, 2004)**

### 2.4.4 Research about reflective learning in language education

Drawing from the aforementioned theories, a growing number of researchers and educators have undertaken empirical research to explore the impact of reflective learning in language education. The researcher conducted an extensive review study on reflection and language learning by analyzing articles indexed in Scopus from 2000 to 2023 and 61 studies were identified. The aim was to discover the prevailing trends and focal points within reflection studies in recent years, particularly in relation to language. Studies on reflection involve different intentions, various reflective activities and the utilization of various technological tools in reflection (Figure 2-10).

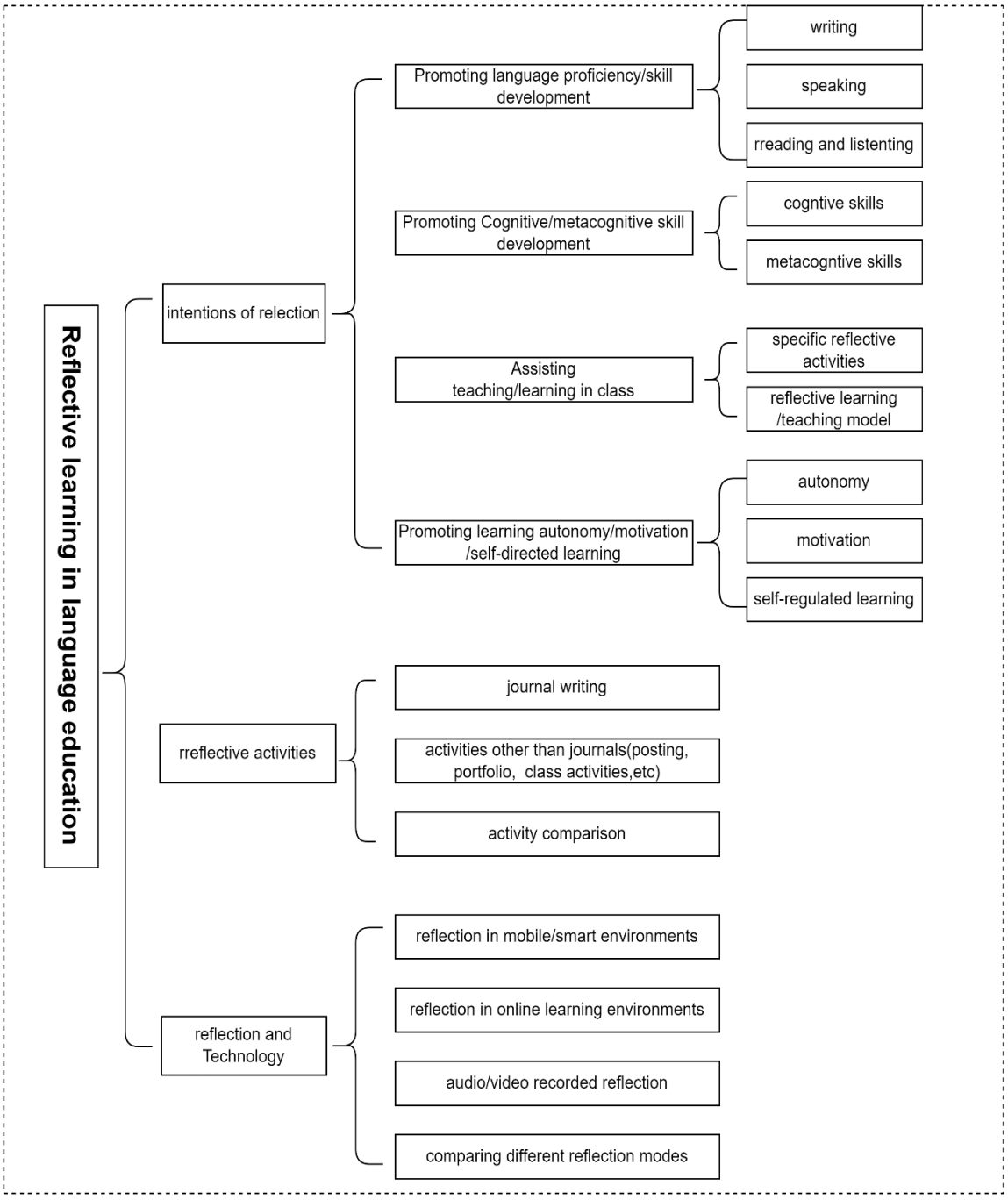



**Figure 2-10. Domains of reflective learning in language education**

(1) The intentions of reflection

The bulk of research on reflection focuses on its influence on the learning outcomes of language learners through the use of one or various reflective activities. Various studies have utilised reflection for the following five intentions.

- Promoting language proficiency/skill development

Reflective practices are primarily employed to promote the development of language proficiency/skills in the realm of language learning and teaching(n=27). Most studies utilize reflection to improve specific language skills such as writing, speaking and

reading.

Reflection was most frequently used to enhance learners' writing skills (n=15). Studies in this category involve the cultivation of reflective writing (Roux et al., 2012; Lee, 2010), creative writing (Hussein et al., 2020), descriptive writing (Jayantini et al., 2022), academic writing (Chien, 2023), experimental writing (Al Maawali, 2022), and process writing (Hassaskhah & Sharifi, 2011; Ngui et al., 2020). The majority of these studies utilized reflective journal writing as the primary reflective activity in the implementation of reflection. For example, Hussein et al. (2020) examined the impact of online reflective journals on college students' creative writing using a quasi-experimental design. The study found that reflective journals had a positive effect on the components of creative writing, including originality, flexibility, fluency, and elaboration. Chien (2023) conducted a case study to analyze how writing tasks and self-awareness reflective writing exercises impact EFL learners' academic writing. The findings revealed that the explicit and systematic process of writing tasks and engaging in reflective writing exercises prompted these researchers to explore the crucial components of academic writing. In addition to journal writing, portfolios are also gaining popularity as a reflective implementation tool due to their ability to stimulate the writing process. For example, Ngui et al. (2020) conducted a study on the influence of e-portfolios on the writing skills of Malaysian students. The results showed that e-portfolios positively enhanced students' writing abilities by providing support during the writing process, aiding in a better comprehension of the subject matter, and improving the overall assessment experience. Other activities employed included posting(Lee, 2010), discussion (Al Maawali, 2022), and photovoice(Jayantini et al., 2022), most of which reported a positive influence on learner's writing skills.

Another frequently explored language skill with reflective practices is speaking skills (Khezrlou, 2021; Lear, 2014; Toland et al., 2016; Li, 2018; Thu, 2020; Paterson, 2022). Studies about oral skills centred on purposes like oral-language production, pronunciation mastery, and presentational and communicative skills. Most studies in this regard employ auto/video reflection and journal writing as the major reflective activities. For example, Thu (2020) employed recorded reflection to investigate the effect of reflection on students' communication skills in a smart learning environment. The findings suggested that reflective practices had a positive impact on learners' speaking skills by enhancing knowledge acquisition, fostering skills such as critical thinking and problem-solving, and increasing motivation and interest. Paterson (2022) explored whether the metacognitive reflection with reflective diaries could promote their speaking skills and the findings suggested that those with pre-existing metacognitive skills are more likely to improve their skills. Additionally, some studies also reported that reflective practices in speaking classrooms provided more opportunities to enhance language skills(Cheng & Chau, 2009; Dantas-Whitney, 2002; Villamizar & Mejía, 2019).

Reading (n=5) and listening (n=1) are two areas that have received less attention in terms of reflective implementation. Studies about reading often focused on the effect of reflective reading journals in promoting reading or reading-writing skills(Chang & Lin, 2014; Evans, 2008; Wang et al., 2023; Yanto et al., 2020), which will be discussed in detail in 2.4.5. The only study about listening skills explored the effect of listening logs (Lee & Cha, 2017).

● Promoting cognitive/metacognitive skill development

Reflective practices are also widely employed to cultivate cognitive/metacognitive skills (CCMS) in language classrooms (n=21) and nearly all of them reported positive impacts. In addition, some studies focusing on cultivating language skills also reported improvement in cognitive/metacognitive skills.

Regarding students' cognitive development, most studies focused on the cultivation of critical/ reflective thinking skills(n=15). Commonly utilized activities in this regard involve reflective journal writing, learning portfolios, and audio-video reflection (Tanyeli Zeki & Kuter, 2018; Şener & Mede, 2022; Farahian et al., 2021; Hassaskhah & Sharifi, 2011 Cheng & Chau, 2009; Dantas-Whitney, 2002). For example, Dantas-Whitney (2002) examined the use of reflective audiotaped journals in an ESL course. The findings showed that students developed critical thinking skills to analyze class topics, and they also explored processes of identity shifting. Farahian et al. (2021) conducted a comparison of writing essays between the control group and the experimental group with portfolio intervention and also explored the learners' perceptions of their levels of reflection. Their findings demonstrated that portfolios can indeed enhance reflective thinking in EFL learners' writing. In addition, multiple reflective activities are often employed to facilitate thinking skills (Mete, 2020; Hong, 2022; Hou & Lien, 2022). For example, Mete (2020) employed video-based reflection, alongside reflective class activities and writing assignments, to enhance the critical thinking skills of Turkish students. The results revealed that students demonstrated higher-order cognitive skills, particularly at the Applying, Analyzing, and Evaluating levels. Likewise, Hou & Lien (2022) documented an enhancement in critical reflection through the implementation of posting and reflective collaboration within a Google-site based project in a smart learning environment.

Concerning students' metacognitive development, several studies sought to examine its role in promoting metacognitive skills such as learning awareness or self-efficacy(Kessler, 2021; Baleghizadeh & Mortazavi, 2014; Thompson, 2012; Chen & Zheng, 2019; Beseghi, 2021; Deveci & Wyatt, 2022).

Beseghi(2021) indicated that reflection helps students trigger awareness about the learning process, achievement, and needs as well as their ideas and approaches in a

study utilizing an online diary as the major reflective activity. Kessler (2021) discovered that the use of reflective journals in a mobile language learning program, serving as a self-reflection tool, effectively fostered metacognitive awareness across five domains(success, target language linguistic feature, tasks, strategies, and challenges). Thompson (2012) implemented metacognitive strategy training, including reflective discussions and reflection exercises after exams, in a Spanish classroom. The study suggested that students could experience substantial benefits (better exam scores) from even a modest amount of metacognitive skills training during class.

Self-reflective skills were found to play a role in promoting meta-awareness, especially self-efficacy. Baleghizadeh & Mortazavi (2014) explored the influence of various reflective journal techniques on learners' self-efficacy. They found that both journals with and without feedback conditions had a positive impact on students' self-efficacy. However, students who received feedback in two different conditions appeared to report higher gains in self-efficacy.

It's noteworthy that numerous studies, not specifically aimed at developing metacognitive skills, have also reported improvements in this area. For example, studies found that students' self-efficacy was boosted by various factors such as receiving timely effective feedback and improving grades (Liu et al., 2021), engaging in reflective activities such as peer editing (Toland et al., 2016), in-class interactions, practice and participation (Torres-Goens & Farley, 2017), non-academic style written assignment and the extra-opportunities to practice writing (Di Gregorio & Beaton, 2019). Once promoted, self-efficacy helps learners overcome fears of mistakes or evaluation (Al Kayed et al., 2020) and be confident about their language skills and the values of their ideas (Lee & Cha, 2017).

● Assisting teaching/learning in class

Some Studies (n=13) explored various reflective practices or reflective teaching/learning models to guide teaching and learning adopted in EFL classrooms.

While reflective journal writing remains the most commonly utilized single activity ((Ahmed, 2020; Mete, 2019; Zhang, 2018; Bharuthram, 2018; Porto, 2007), other activities such as posting and multiple activities in reflection implementation is on the rise (Liu et al., 2021; Torres-Goens & Farley, 2017; Krishnaiyer et al., 2012; Corrales & Erwin, 2020; Murugaiah & Thang, 2010; Pais & Herrington, 2022). Regardless of the activities employed, literature consistently indicates that reflective practices contribute to promoting the learning process and enhancing mutual communication between students and teachers. For instance, Porto (2007) explored the role of a learning diary in an English classroom with English learners in Argentina over a year. The findings underscored that diaries are a valuable tool for understanding students' inner thoughts, fostering teacher-student communication, and promoting students' self-

regulated learning by keeping track of and assessing their own learning. Krishnaiyer et al. (2012) investigated the impact of blogs on facilitating reflection among first-year law students. The findings indicated that using blogs for reflection helped students review and evaluate their learning as well as understanding the course content. Additionally, it provided them with opportunities to express themselves and share ideas. Corrales & Erwin (2020) investigated the correlation between posted tweets and course scores. They found that learners might retain knowledge better and deepen their comprehension of the course content through tweet reflection. Liu et al. (2021) incorporate a reflective thinking-promoting mechanism into artificial intelligence-supported English writing environments by integrating an online automatic feedback system and online reflective questions into the writing process. The findings indicated that such a mechanism could enhance writing performance, boost self-efficacy, and self-regulated learning, while also reducing cognitive load and increasing motivation to learn. Similarly, Torres-Goens & Farley (2017) explored the effect of various reflective practices such as reflective questionnaires, recording, and online learning in an American language classroom. The findings revealed that reflection serves as a positive learning tool by promoting class participation, boosting students' confidence, and helping them examine and surpass their comfort zones.

A few studies try to build a reflective model to guide the teaching/learning process (Kizilcik & Daloğlu, 2018; Murugaiah & Thang, 2010; Bharuthram, 2018). For example, Kizilcik & Daloğlu (2018) designed and implemented an Interactive Reflection Model in the EAP course and reported the benefits of each reflective activity for both learners and instructors. Murugaiah & Thang (2010) also designed and implemented an Interactive and Reflective Learning model for online distance learners in Malaysia. The findings suggested that the proposed learning model contributes to awareness of the learning process and cognitive skills. Furthermore, peer interaction conducted in the model motivates students to improve their writing and become more self-directed learners. Fonkamo & Zeru (2022) did not provide details on the model design. Instead, their study focused on exploring the impediments to the application of reflective teaching in EFL paragraph writing classes. They reported the challenges faced by both teachers and students in implementing reflective teaching methodologies.

The literature reviewed above suggests that compared to studies using single reflective activities, those employing a reflective model or multiple reflective activities often report greater benefits in terms of learning outcomes, learning processes, and teacher-student communication.

● Promoting learning autonomy/motivation/self-directed learning

Several studies investigated the effect of reflection on learner autonomy and self-regulated learning(Şener & Mede, 2022; Tanyeli Zeki & Kuter, 2018; Menegale, 2020; Lee & Mori, 2021; Lee, 2013). For example, Tanyeli et al. (2018) investigated the

impact of collaborative and reflective writing activities on learner autonomy within a writing program. They observed that learners' autonomy in writing improved by gaining awareness of their writing process, enhancing writing skills, increasing motivation, and boosting self-confidence. Likewise, Şener & Mede, (2022) also implemented reflective journals and collaborative learning to cultivate learner autonomy and reflective thinking among Turkish intermediate language learners. The findings revealed a significant improvement in autonomy and reflective thinking.

Regarding motivation, while no studies specifically focused on this aspect, a dozen studies indicated that reflective practices can also enhance learning motivation. Reflective practices such as blog entries could increase students' motivation to write for a broader audience (Lee, 2010). Students can be motivated through video-assisted reflections to engage with language-related culture (Villamizar & Mejía, 2019). Likewise, learning logs can foster autonomous and active learning among students, thereby enhancing their motivation to acquire new vocabulary (Yanto et al., 2020).

In regards to self-regulated learning, Lee & Mori (2021) investigated the impact of reflective practices as instructional strategies on students' self-directed learning competency in speaking classes. They discovered that reflective activities were significant predictors of self-directed learning competency. They also noted that the reflective process was beneficial in terms of understanding what and how students could continue to improve their learning, particularly through giving and receiving feedback. Lee (2013) explored the role of reading response e-journals in creating a social and self-regulated learning environment for low-achieving students and discovered that such activities would motivate and engage students in reading and writing activities and then boost their confidence in learning. Moreover, several studies not originally aimed at exploring self-regulated learning skills also reported this benefit. Students' regulated learning was improved significantly by offering them more autonomous learning opportunities, timely and effective feedback, and clarification of good writing (Liu et al., 2021). Through reflective practices, learners could have more opportunities for regular writing experiences (Absalom & De Saint Léger, 2011), take better control of their learning and make adjustments when necessary (Lee & Cha, 2017).

(2) Reflective activities

Most studies employed one reflective activity as the major way of conducting reflection(n=50). Reflective journal writing(n=36) is the most popular way of reflection. It was implemented in various forms such as reflective writing tasks (Kizilcik & Daloglu, 2018), reading-response journals (Lee, 2013), reflection reports (Mete, 2019), and dairies (Beseghi, 2021; Paterson, 2022).

Popular activities utilized other than journal writing were posts in blogs or discussion

forums(n=6)(Krishnaiyer et al., 2012; Lee, 2010; Corrales & Erwin, 2020), reflective portfolio(n=7) (Ngui et al., 2020; Pais & Herrington, 2022), reflective feedback(n=4) (Pham et.al., 2020; Hou & Lien, 2022), and reflective class activities(n=7) (Hong, 2022; Al Maawali, 2022). Among these, posting and portfolios are reflective activities frequently used independently to enhance the learning process and boost learning achievements. For example, Corrales and Erwin (2020) examined the perception of EFL students regarding their reflective skills and explored the correlation between deep reflection and improved exam performance by analyzing their posted tweets. Pais & Herrington (2022) investigated students' engagement in individual and collaborative reflective practice through reflective portfolios and discussed the benefits of such activities. However, Feedback/ reflective class activities are frequently integrated with other activities during the implementation process of reflection. For example, Hou & Lien (2022) utilized various reflective activities, including reflective writing, peer feedback, and group collaboration, to assess the promotion of students' critical thinking skills.

Furthermore, certain studies concentrate on comparing various reflective activities to assess which ones have a greater impact on learners' skills. For example, Absalom & De Saint Léger (2011) compared the use of blogs and diaries among Australian learners of French and Italian. The finding suggested that the two were both suggested useful. Baleghizadeh & Mortazavi(2014) examined various types of journaling techniques on EFL learners' self-efficacy. Their findings suggested that techniques incorporating feedback conditions appeared to significantly enhance self-efficacy levels.

(3) Reflection and technology

The utilization of technologically scaffolded reflection has been gaining wider popularity in recent years. A multitude of studies (23) involve the application of information technology to facilitate reflection. (The number could be larger, as in some research they didn't report whether information technology was employed.).

Several studies（n=5） have integrated reflection within mobile or smart learning environments to enhance the learning process. The integration of mobile technology in reflective practices significantly enhances the seamless language learning process, enabling learners to engage in learning anytime and anywhere. For example, Wang et al. (2023) and Kessler (2021) both integrate reflection into mobile-assisted language learning to facilitate reading learning and metacognitive skill development respectively. Hong (2022) and Thu (2020) implement reflection into language learning in smart environments to promote learning motivation and communication skills respectively. Toland et al. (2016) integrated mobile-assisted recording reflection in an EFL course to promote students' presentation skills.

Many studies(n=19) implemented reflection in online learning environments or by

adopting online collaborative tools like blogs/twits/google doc, to promote writing, reading or metacognitive skills (Liu et al., 2021; Hussein et al., 2020; Chang & Lin, 2014; Hou & Lien, 2022; Pham et.al., 2020; Murugaiah & Thang, 2010; Cheng, 2017; Beseghi, 2021; Lee, 2013; Mete, 2020; Corrales & Erwin, 2020). For example, Liu et al. (2021) introduce a reflective thinking-promoting mechanism into artificial intelligence-supported English writing environments (composed of online automatic feedback to writings, students'online reflection, and peer feedback) to promote students' writing and reflective thinking skills. Chang & Lin (2014) integrate reflective-e-journal into a web-based reading program to promote students; reading proficiency. Corrales & Erwin (2020) explored the effect of twit reflection on students' learning gains and discovered there were correlations between deep reflection and better performance in exams. Murugaiah & Thang (2010) developed an online reflective learning model for writing among distant Malaysian students in college, which is the only reflective model constructed based on technology.

Still, some other studies(n=6) adopted video and audio recording to facilitate reflection (Cheng & Chau, 2009; Dantas-Whitney, 2002; Villamizar & Mejía, 2019; Li, 2018;). For example, Cheng & Chau (2009) utilized digital videos to foster self-reflection in an e-portfolio environment and discovered students improved their critical thinking and identity shift in the learning process as well as more opportunities for oral practice. Similar findings were also reported in the study of Dantas-Whitney (2002) with audiotaped journals. Villamizar & Mejía (2019) also reported that digital video journals in a university foreign language course provided opportunities to improve critical thinking skills, written language proficiency and oral communication. It also heightened motivation for lg-related culture, and minimize anxiety toward communication.

Several studies(n=2) endeavoured to examine the effects of different modes of reflection on learners' perceptions(Absalom & De Saint Léger, 2011; Wang et al., 2023). For example, Wang et al. (2023) investigated learners' attitudes toward various reflection methods, including paper-written journals, audio reflection, e-journals, and group reflection within a mobile learning program. Their findings revealed that learners exhibited a preference for paper-written journals and audio reflection over other modes.

A recent meta-analysis by Zhai et al. (2023) also indicated that reflective learning interventions lead to greater learning gains in online learning environments than in offline learning environments.

Based on the analysis, we discovered that research on reflection implementation supported by mobile technology was rather limited (5 studies), and no studies attempted to develop a reflective model with mobile technology. However, much research has

been done on the implementation of reflection with online learning platforms or tools.

### 2.4.5 Research about reflective learning in English reading

Given the study's focus on in-depth language learning, particularly in reading comprehension, an additional section on "Reflective Reading" will be included to provide a comprehensive understanding of the academic context and the novelty of this research.

The number of studies on reflection and English reading is relatively limited, with only 5 papers in more than 20 years. Among all the studies, three utilized a mixed research method, while the remaining two employed a qualitative research approach. Among the three mixed studies, only one study employ the experimental group to examine the intervention effect.

Of the five studies, two studies integrated reflective activities into the in-class curricular design to promote learners' language skills. For example, Chang & Lin (2014) integrate reflective e-journals into a web-based reading course. Students were required to complete a reading journal every week and submit it. The finding revealed that Students who utilized reflective learning e-journals demonstrated higher performance in reading comprehension compared to those who did not use them. In addition, students also reported improvement in communication, organization and certain self-regulation skills. Evans (2008) integrated reflection reaction journals into an English for Academic Purposes (EAP) program to facilitate reading comprehension and reading-writing tasks. The research findings indicate that RRJs (Reader Response Journals) can function as a tool for students to activate metacognitive reading strategies crucial for initiating successful reading comprehension. Moreover, they can facilitate students' transition across the reading-to-writing interface, particularly when assigned texts are utilized for writing assignments.

Another Three studies incorporated reflection into the off-class curricular activities of diverse online and offline reading programs. For example, Lee (2013) introduced a reading response electronic journal into a freshman English course for low-achieving students. Students learned the reading materials together in class and then completed and posted reading-response journals on the class forum as assignments. The results indicated that students improved in their writing and felt motivated and engaged in these activities. In addition, the interaction both among students and between students and teachers was promoted. Yanto. et. al. (2020) implement a literary text extensive reading program with learning logs. Students read the literary text after class for pleasure reading and then completed their learning logs as weekly assignments. They documented their progress and learning process in the logs, which were occasionally shared with the class upon request. The empirical findings revealed that students enhanced their participation and autonomy in the process of identifying text,

constructing meaning, and reflecting on their understanding of the text. Wang et al. (2023) examined the effect of a mobile reading program facilitated with reflective journals in one English class and further investigated learners' preferences for reflection modes. The findings suggested that the program significantly improved students' reading proficiency, with students expressing a preference for paper-based written journals and audio journals over e-journals and collaborative journals.

Based on the analysis of reflection implementation in language learning, it is evident that most studies primarily concentrate on writing or cognitive/metacognitive development. However, research specifically focusing on English reading remains relatively limited. Furthermore, only a small number of studies attempt to formulate a learning/teaching model grounded in reflection that spans the entire learning process, with most opting to incorporate only specific reflective activities to aid the learning.

Regarding the implementation of reflection in reading learning, more studies integrated it as an off-class curricular activity. In addition, in most cases, reflection was utilized in one stage of the learning process rather than throughout the entire learning journey. Also, very few studies attempt to formulate a reflective learning model for reading to guide the entire learning and teaching process. In addition, the majority of studies utilize a single reflective activity like journaling for conducting reflection. Moreover, quantitative analysis regarding the impact of reflection on reading proficiency is limited. Only one study (Chang & Lin, 2014) employed experimental comparison to investigate the effect of reflection intervention, while another two studies (Lee, 2013; Wang et al., 2023) only compared the pretest and posttest reading proficiency of one group of students. Another two studies (Evans, 2008; Yanto et. al., 2020) utilized qualitative analysis to examine the effect of reflection implementation. Furthermore, the role of journal entry was not fully explored in previous studies. Fewer studies have explored the content of journal entries to understand students' learning gains or conditions, while more studies have relied on interviews, questionnaires, or test scores to collect such data (Hisakuni, 2010). Consequently, there is a pressing need for further research to comprehensively understand the impact of reflection on the reading process and learners' learning gains from various aspects such as the reflection stage, activities and methods of data collection and analysis.

# Chapter 3 Incorporating Smartphone-assisted reading into Language classrooms

In this chapter, we presented the design and findings of a classroom action research which focused on integrating self-paced smartphone-assisted reading into the language learning process. The objective was to examine students' learning habits and assess their perceptions regarding the effectiveness of this program.

## 3.1 Research introduction

A globally recognized problem for young learners is their disinclination to read. As smart technology has penetrated every aspect of people's lives, they are accustomed to obtaining information from such sources as Twitter, YouTube, and short videos, instead of reading news or articles. Since reading is one of the best ways to understand a culture and learn its language, it is important to motivate learners to read more authentic literature. Many language teachers have advocated or attempted extensive reading programs in language classes. In such programs, learners are encouraged to read several passages on diverse topics for enjoyment and knowledge or to pass the time (Day & Bamford, 2002). Such programs will enhance students' interest in reading, improve their ability, and promote better learning habits. With the popularity of mobile devices, especially smartphones, educators and researchers have realized their potential for facilitating language learning and teaching. Mobile devices are increasingly used to help improve learners' language abilities (Ally et al., 2007).

Hence, the mobile learning habits and willingness of students are pivotal factors influencing the successful implementation of any learning programs utilizing mobile technology. Moreover, effectively managing their mobile learning process is also a crucial factor that can impact their learning outcomes and satisfaction. Since the participants in the study are college freshmen who have recently transitioned from a test-oriented study environment in high school, they may have limited exposure to widespread mobile learning experiences and self-regulated learning experiences. Given these considerations, Study I was conducted to examine students' mobile device usage for studying and their willingness to integrate mobile extensive reading into their regular learning routine.

The study is expected to meet the first subordinate research objective(SRO1).
SRO1-to explore students' learning habits and perception of mobile learning in English reading learning. SRQ1 will be achieved by pursuing two specific research objectives.

SRO1_1: to investigate students' mobile learning habits.

SRO1_2: to explore students' perception of mobile English learning.

### 3.2. Research method

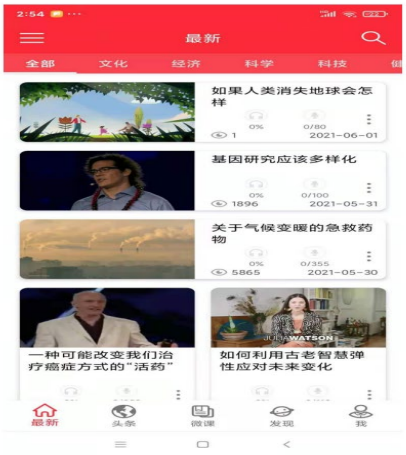
#### 3.2.1 Study setting and participants

This research was conducted in a class specializing in Teaching Chinese to Speakers of Other language. This class was chosen because of its unique features. Since students in this major are expected to gain good language proficiency to teach foreigners, they are required to take more English classes than regular college students and access additional English learning materials. Therefore, digital English learning materials were familiar to them. In addition, most students in this class had a satisfactory or proficient knowledge of English and were interested in language studies. Hence, we assumed that these students would not object to learning to read English on smartphones.

The participants in this study were 32 students in one class, comprising 27 women and 5 men; they were all sophomores and had studied English for more than six years. More than 70% of the students were from the local province, implying a similar learning background.

#### 3.2.2 Smartphone applications adopted in the study

All the participants in the program owned a minimum of one smartphone, which provided a foundation for the study. Two smartphone language learning applications were adopted in the study: TED and Baicizhan Love Reading. Students were required to download these two applications and choose suitable materials from them to read.
TED (Figure 3-1) is an application that provides speeches by famous people. Students can select a subject that interests them or a person they admire and choose corresponding speeches. The advantage of TED is that it provides abundant video resources for students to read, listen to, or watch. The drawbacks are that it does not rate content into different levels of difficulty, so it is hard for students to choose passages appropriate to their language level. Moreover, apart from speeches, no other resources were provided, which eventually resulted in a loss of interest among students.



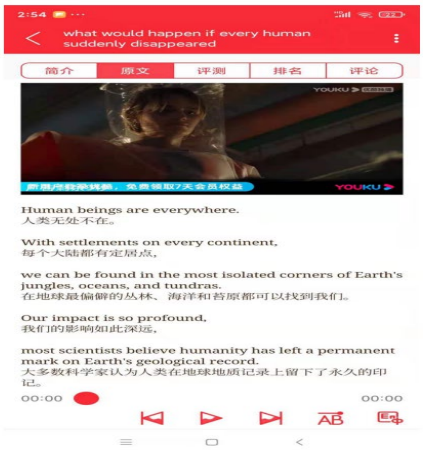



**Figure 3-1. “TED” Interfaces for homepage and passage page**

(https://www.ted.com/talks?language=zh-cn.)
( The picture on the left is the homepage and the button at the top is “The latest.” Buttons in the second line are “All,” “Culture,” “Economy,” “Science,” “Technology,” etc. The buttons at the bottom are “The latest,” “Headlines,” “Micro lecture,” “Discovery,” and “Me.” The picture on the right is the interface students see when they click the button for one passage. The buttons at the top are “Introduction,” “Original text,” “Assessment,” “Ranking,” and “Comments.”)

To solve the problems of reading passages in TED, a second application, Baicizhan Love Reading (Figure 3-2), is suggested. This application offers various kinds of materials, such as poems, novels, stories, and journal articles for students to read or listen to. In addition, it provides passage ranking at the reader’s convenience and a shadowing function that allows students to practice their pronunciation. However, the learning resources on this application are limited, and many passages are not for free. The reason students are not allowed to choose learning applications for themselves is that, first, there are too many applications available, some of which are simple copies of others. Students are very likely to be overwhelmed by these resources. Second, it is difficult to monitor and check the learning process under such circumstances. With only two learning applications, researchers may, if necessary, refer to the original passages to check students’ learning processes.

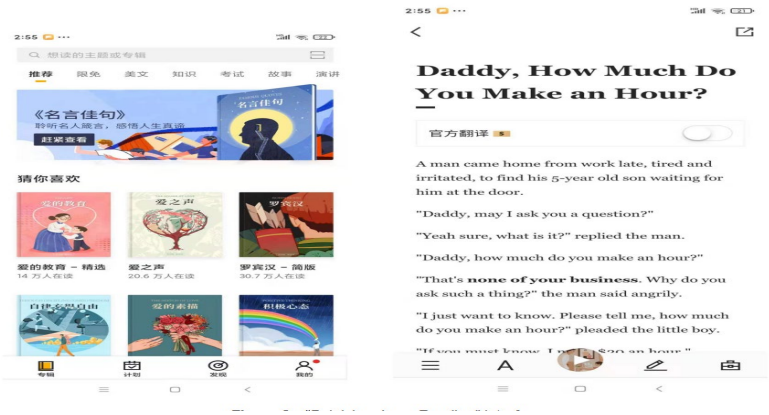



**Figure 3-2. “Baicizhan Love Reading” interfaces for the homepage and passage page**

(https://www.baicizhan.com/)
(The picture on the left is the homepage. The buttons at the top are “Recommendations,” “Passages free for a limited time,” “Classics,” “Knowledge,” “Tests,” “Stories,” and “Speeches.” The buttons at the bottom are “Article album,” “Plan,” “Discovery,” and “Me.” The picture on the right is the interface students will see when they click the button for one passage. )

### 3.2.3 Research procedure

This research began in September 2019. The researcher, the first author, taught the participants in the course *Intensive English*. Reading exercises via smartphone applications were used as a complement to the teaching process. The study lasted for approximately 14 weeks. In the first week, we explained the purpose and procedure of the study and demonstrated the use of the two applications to the students. From Week 2 to Week 13, students were required to read a minimum of five passages via smartphone applications per week and write a reflection journal for each week's reading. We monitored their reading process by checking 10 students' journals and asking questions during class breaks every week. The assessment of reading performance was based on reflection journals and in-person interviews. The teacher informed students that their performance in the study would be reflected in their final examination scores (10% of the final grade). In Week 14, we requested all students to complete an anonymous questionnaire. Five students were then chosen at random to attend a semi-structured interview to gather their ideas and perceptions.

### 3.2.4 Data collection

Data were collected from the questionnaire and interview at the end of the program.
The questionnaire, consisting of 19 single-choice and multiple-choice questions, asked about students' perceptions of this type of learning experience (Appendix II). The first part contained three basic questions. The second part consisted of nine questions concerning students' learning habits via smartphones and the pros and cons of mobile-assisted reading. The third part consisted of seven questions inquiring into the students' perceived learning effect after the program.
The semi-structured interview was conducted based on the students' subjective responses to the mobile reading program via smartphones. Five interview questions (IQ) formed the foundation of the interview (Appendix II). Students answered the interview questions in Chinese after the program, and the teacher wrote down their answers and translated them into English.

## 3.3 Results

### 3.3.1 Basic information.

Most participants are female students (84.4%). About their use of smartphones (Q2), we can see from Figure 3-3 that more than 75% of students spent 5 hours or more playing with their smartphones and only 6.2% spent less than 4 hours per day. This reveals the deep penetration of smartphones in students' life. For Q3, Figure 3-4 shows nearly 75% of students spent 1 hour or more studying English, indicating that the students generally attached importance to English study.

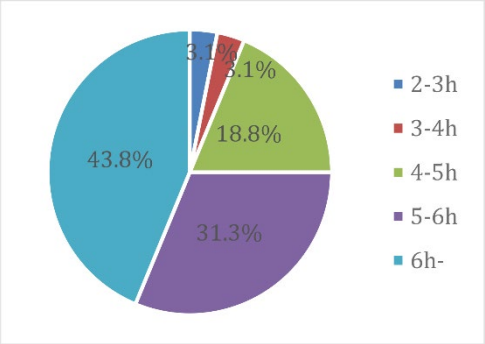



**Figure 3-3.** Time students spent on smartphones per day

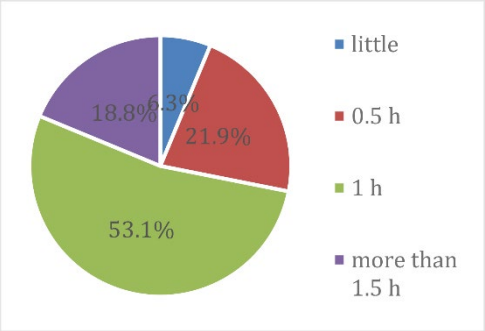



**Figure 3-4 Time students spent studying English per day**

### 3.3.2 Learning habits and advantages/disadvantages of English reading on smartphones

With reference to general opinions about mobile language learning (Q4), 84% supported this approach and regarded it as a useful complement to traditional learning. In their learning frequency (Q5), 50% read via smartphones occasionally and 34% read often. A total of 16% chose to read via smartphones daily. The learning time span (Q6) was centered on 10–20 min (25.0%) and 20–30 min (44%). As to when they read (Q7), most students (56%) did not have a specific time to read via smartphones. A total of 22% chose to study at a fixed time, and another 22% chose to read the day prior to handing in the reading journal. It is surprising that no one chose to read while they were waiting or when having meals. Regarding the problem of cost (Q8), nearly half of the students preferred not to spend money to access learning materials (50%), while 47% could pay 10 Yuan per month for those materials.

In addition, at the interview, students presented their ideas about smartphone-assisted reading. Concerning reading preferences, more favoured paper books, but most accepted mobile reading as part of the language study process.

IQ1: Do you like the learning experience of reading via smartphone?

*S1: I like it, as I can find abundant reading resources to read or watch.*
*S2: I like it, but I cannot concentrate on such reading practice for long as I am often distracted by games or social media tools.*
*S3: I think such experience is useful and necessary, but I cannot say I like it as I am not used to reading via smartphones, which is an entertaining and communicative tool.*
*S4: I dislike it. It strains my eyes, and I cannot concentrate on reading passages in this way. I like paper books.*
*S5: I accept this way of study, but I cannot say that I like it.*

IQ2: Do you prefer mobile reading or paper reading?
*S1: I prefer mobile reading. The great advantage of vast resources is overwhelming over traditional paper books. In addition, you can choose to read at any time or place without bringing books.*
*S2: I think that depends on what kind of materials you are reading. If you read important documents or prepare for tests, paper books would be better. If you read for pleasure or to enrich your knowledge, then mobile reading is better.*
*S3. I prefer paper books, but I also accept mobile reading because it will provide more resources. This may be helpful at times.*
*S4: I prefer paper books. I am more familiar with reading paper books, and it is healthier.*
*S5: I prefer paper books. I cannot find proper learning resources via smartphones, and good passages are not always free.*

For platform preference (Q9), 71% of students favoured language-learning applications. Video websites followed, with 44%. New websites (13%) enjoyed the lowest popularity among the students. For resource preference (Q10), video (78%) was the most favoured resource among students, classic stories (53%) were ranked second, then news (44%) and others (16%) followed.

In the interview, students were asked about their opinions concerning the two applications (IQ4). Generally, students considered them useful, but they complained about the expense and content.
*S1: Basically good, but many passages cannot be accessed for free.*
*S2: Rich materials but sometimes translation of passages needed money.*
*S3: It is better to have more passages with sound. In addition, the suitable passages are not sufficient.*
*S4: Too many charged passages. It is difficult to find proper passages for reading.*
*S5: It is not easy to find suitable passages for me. Thus, more free and rated materials are better.*

On the advantages of mobile learning (Q11), as shown in Figure 3-5, the top two advantages are studying anytime (80%) and abundant and latest resources (47%). The

two less important advantages are promotion of interest (34%) and monitoring of the learning process (28%). For problems affecting mobile reading (Q12), according to Figure 3-6, the top three problems are the distraction of social media (81%), unstable network conditions (47%), and not forming the habits of mobile reading (34%). Technical aspects seem to matter less, such as small screens (22%), high expenses (16%), complex operations (13%), and smartphone storage (3%).

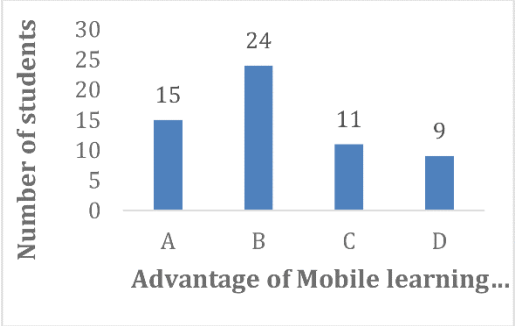



**Figure 3-5. Advantages of mobile reading**

(A. Abundant and latest reading materials
B. Learning at any time and any place
C. More learning interest stimulated by video
D. Learning achievement can be monitored)


**Figure 3-6. Problems affecting mobile reading**

(A. Small screen B. Complex operation
C. Distraction problem D. Unstable network condition
E. High cost F. Fmall smartphone storage
G. Not forming the habit of mobile reading)

### 3.3.3 Learning effect students perceived after the program

For reading and listening abilities (Q13), 69% of the students reported a positive effect of this approach in improving their language abilities, 19% said it had little effect, and 13% said they were unclear about the effect. In learning interest (Q14), 75% of all students stated that their interest had increased, while for autonomous learning ability (Q15), 56% of the students agreed that their autonomous learning ability improved during this process. On knowledge gains (Q16), 84% of all students held that they had

enriched their language and cultural knowledge. With regard to study load (Q17), the majority of students (84%) thought it was not a heavy load. However, opinions varied concerning the combination of the learning effect and load. 50% thought the learning was effective without a heavy load, but 34% thought it was not effective without a heavy load. Regarding methods for process management and assessment (Q18), 59% agreed that these methods were effective; however, 34% of students thought they needed redesigning and improvement. For future use (Q19), 78% of students expressed their willingness to continue this learning approach in the future.

In the interview, students were asked to explain their opinions about ability improvement (IQ3). Some students expressed concern about the lack of scaffolding.
*S1. I believe it has improved my reading, speaking, and listening. I watched and listened to many passages. I liked the shadowing function and used it many times to practice my pronunciation.*
*S2: I think I have enriched my knowledge of language and culture. My listening may have improved too. I read and listened to many passages, but I do not know whether my understanding or reading ability has improved as there are no questions or tests on these passages.*
*S3: I think my reading and listening abilities are improved. I read many short stories and passages. It seems that my reading speed via smartphones improved slightly. I think teachers can instruct us with skills in reading online passages.*
*S4: I do not know about it. I simply read passages, and there were no questions for checking the reading results.*
*S5: I am not sure whether I have improved. Some stories were long, so I read them over several days. In the end, I might have forgoten what I had read at the beginning.*

With regard to the assessment process (IQ5), many confirmed the importance of assessment and process management, but believed more flexible ways could be used during the process.
*S1: I think assessment is effective in motivating students like me who do not have strong self-control.*
*S2: More random checking should be used as some students may escape without finishing the assignment.*
*S3: It is a good practice, as I was stimulated to read many English articles. However, writing journals is somewhat troublesome.*
*S4: It is a heavy load for me because I read a lot after class. Therefore, it would be better if the assignment and assessment were more flexible.*
*S5: I do not know whether such reading practices will improve my comprehension because there are no questions or checks about understanding the passage. Besides, it is not interesting, simply learning tasks, and I will not continue it.*

## 3.4 Discussion

### 3.4.1 Reading habits via smartphones.

For SRO1_1 (investigate *students' learning habits with mobile-assisted reading via smartphone applications)*, results indicated that many students did not form the habit of regular mobile-assisted reading. Nearly half of them read English occasionally (once or twice per week) via mobile devices. Regarding learning time, students would read about 10 to 30 minutes on their devices. They seemed to attach more importance to English studies, as more than 70% study English for more than one hour per day. Therefore, we believe that if good mobile-assisted reading habits can be formed, students can benefit in language studies as well as studies of other disciplines. Concerning learning platforms, students favoured language learning applications (71%) over other platforms via smartphones. We thought this was partly because students are not used to learning languages through news or video websites. Another reason may be that the apps were recommended by the teachers. Therefore, teachers may provide proper guidance or encouragement for students to explore more learning platforms via mobile devices. Different channels provide diverse information and knowledge, which can bring students enjoyment and help build positive learning habits. As for the learning materials, students favored video reading materials (78%) over all others. The problem of expense was the main complaint that students had about existing applications; most wished for free usage or cheap prices, in line with previous studies (Ally et al., 2007) . Teachers and students may work together to share higher quality but low-price learning resources. For developers of applications, this is a cause for concern. Eventually. Cost is one of the major reasons why students give up a learning platform, but if the platform can develop ways to offset these side effects, such as daily attendance or learning achievement meaning a certain discount on price, it may build customers' loyalty and retain more learners in the long term.

### 3.4.2 Perception of mobile English reading on smartphones.

For SRO1_2 (*investigate students' perception of mobile English reading*), it was discussed from three perspectives: acceptance of mobile learning, advantages/disadvantages of mobile reading, and the learning effect of this program.

Concerning students' acceptance of mobile learning via smartphones, interviews and questionnaire results showed that students (84%) generally supported or accepted smartphones as a learning device. Moreover, 78% stated that they would use it in their future reading studies. This positive attitude of students revealed greater potential for smartphone-assisted language learning in the future.

Concerning students' perception of the pros and cons of mobile-assisted reading, the questionnaire results revealed that the top two advantages are studying at one's convenience (80%) and abundant and latest resources (47%). The top three negative

factors were distraction from social media (81%), unstable network conditions (47%), and being unaccustomed to reading via smartphones (34%). Surprisingly, technical factors seemed to matter less, such as small screens (22%) and complex operations (13%). We see that it is important to support students in developing good habits with smartphone use, as it is the foundation for breaking smartphone addiction and developing good learning habits.

With regard to perception of the learning effect, more than 70% of all students agreed that this learning approach was effective in improving their learning interests, advancing autonomous learning ability, and promoting their reading proficiency. This is in accordance with previous research that the integration of smartphone applications in teaching and learning processes promoted interest (Thornton & Houser, 2005) , confidence, motivation (Huang, 2013a). , and performance (Wang & Smith, 2013). In addition, almost 78% of all students expressed their willingness to continue this learning approach in the future, indicating the formation of new reading habits among students.

However, certain problems cannot be overlooked. Approximately 31% of students disapproved of this approach, and nearly 34% thought that the assessment and process management methods required redesigns and improvements. We assume that this might be due to the following reasons. First, students with either very low or high language achievement might not be able to find suitable reading materials. Second, as the stimulation method by exam grades is simple, some students may just read to complete assignments, thus losing interest after a period of time. Moreover, the program design lacks collaboration and scaffolding. This is due to the fact that apart from reading passages for exams, other passages on smartphone applications usually do not set comprehension questions for readers. In addition, communication is difficult to achieve, as students read different passages on applications. However, these two factors are of great importance in stimulating students (Lin, 2014; Qing, 2017). Future studies may focus on how to motivate students using methods such as scaffolding or social media tools.

### 3.5 Conclusion

This study focuses on investigating the perception of college students about an extensive reading program via smartphones. Its finding revealed that despite the deep penetration of smartphone use in daily life, those students didn’t form the habit of mobile reading. However, most students approved of this reading-learning approach and reported improvement in their reading and listening abilities. Smartphone-assisted reading was accepted for its abundance of resources and convenience. Language learning applications and video resources were greatly favoured among students. But

at the same time, many problems concerning this approach emerged in the study such as distraction, cost, motivation, evaluation, etc.

The present study poses a few limitations. Firstly, participants are confined to students in one major and the number is relatively small. Secondly, the integration of smartphone reading applications is not very close to the teaching process. Basically, the learning process is still self-paced by students as most studies did (Nurieva, 2019) . Teachers act as monitors and evaluators of their reading performance by reading journals, but ways to motivate students and manage the learning process are simple, not diverse.

### 3.6 Summary of this chapter

In this chapter, we reported the design and results of an action research, which aimed to investigate students' mobile learning habits and perception of mobile-assisted English reading. The questionnaire was used to explore student's learning habits and preferences for materials as well as their perception of mobile English reading. The semi-structured interview was conducted to further investigate student's perception of their learning via smartphones as well as their ideas for assessment and monitoring in the process. Additionally, the interviewer's suggestions for mobile learning were summarized in this chapter, which were analyzed and adopted for the design of the learning model in the following chapters.

# Chapter 4 Integrating reflection into mobile reading learning

In this chapter, we presented the design and finding of a mobile-assisted reading program which focused on the role of reflection in students' learning process. We integrated reflective activities into the program and then investigated students' perception of reflective practices and the preferences for reflection modes adopted

## 4.1 Research introduction

The results of Study 1 showed that students generally embraced mobile language learning, although they had not fully developed mobile learning habits. When it comes to process management techniques in the program like reflective journals and reflective questions, although many students found them important, they also perceived them as uninteresting, overly simplistic, or lacking in diversity.

In Study 1, our analysis of reflection was solely on examining the role of reflection as a process management method. However, we did not delve into other aspects of reflection, such as its potential for stimulating interest and promoting critical thinking. Furthermore, given that many students found the process management techniques simplistic and lacking in motivation, it is crucial to investigate what types of reflection might better resonate with students and enhance the learning process, especially in the mobile learning environment.

In addition, some research gaps were identified regarding reflection types. One concern is related to the mode of reflection. Traditional reflection usually takes the form of paper journals but with the booming of mobile technology, diverse modes of reflection emerged, such as e-journal, audio reflection, video reflection, etc. However, few studies compare the effect of different reflection modes on the learning outcome and process. The other concerns reflection on mobile learning, esp in mobile learning apps. Scholars like Kessler (2021) have noted that many apps are restricted in function as they lay more emphasis on vocabulary acquisition, which results in rare opportunities for users to practice reflective activities. Also, the written e-journal is the usual way of reflection for the few apps that provide this function. Consequently, studies about the effect, function, and format of reflection in MALL apps are very limited. However, such activities that promote reflection are useful for learners' learning metacognitive development and language gains (Togaibayeva et al., 2022; Ahmed, 2020). Therefore it is necessary to investigate the diversity of reflection in mobile language learning.

Given these insights, Study 2 was conducted to explore the role and diversity of reflection in mobile-assisted language learning by integrating reflective activities into a mobile-assisted reading program and then investigating students' perception of the reading program, reflective practices, and the reflection modes adopted.

This study is expected to meet the second subordinate research objective (SRO2).
SRO2: to investigate students' perception of reflective practices and preferences for reflection modes in mobile English reading

SRQ2 will be achieved by pursuing three specific research objectives.
SRO2_1: to investigate students' perception of the role of reflection.
SRO2_2: to investigate students' preferences for reflection modes.
SRO2_3: to explore the effect of the proposed mobile-assisted reading program facilitated with reflection upon students' language performance.

## 4.2 Research method

### 4.2.1Experimental setting and participants

This experiment was conducted in two classes majoring in Translation and English respectively in Dalian Polytechnic University in 2020. The two majors belonged to the School of Foreign Language. Both two majors aimed to cultivate English talents for social demand. For students majoring in English, they were expected to learn English and various professional skills to undertake English-related professions in the future. For students majoring in Translation, they were expected to grasp English and translational skills to take on translation-related work in the future. As the two majors enrolled students with a requirement for language proficiency (minimum score requirement for language in the Entrance Examination), we considered that most students in the two classes had satisfactory knowledge of English. In addition, since the COVID-19 pandemic in 2020 caused the shutdown of face-to-face education twice in the university, online learning via computer or mobile devices was widely adopted as a crisis-responding method. In such situations, mobile learning was frequently used as a supplement to or a part of class instructional activities with more acceptance from students.

60 students participated in this research, including 53 women and 7 men; Most participants were women because language majors were generally more popular among women than men. They were all college students in their first year and had learned English for over six years. The average age of students was 18.7 and the standard deviation was 0.64. All participants possessed a minimum of one smartphone, providing the foundation for the study.

### 4.2.2 Resources

One online learning platform Chaoxing was required for all participants as they were supposed to upload their reflections online. Chaoxing (Figure 4-1), an online learning platform developed for teachers and students, provides a good channel for students' autonomous study and assists students' learning outside the class.


**Figure 4-1. Chaoxing learning platform**

Regarding the smartphone applications for reading, TED and Baicizhan Love Reading were recommended. TED (Figure 3-1), an application specializing in speeches, shares speeches of various kinds with learners. Another application, Baicizhan Love Reading(Figure 3-2), offers students diverse reading materials, such as stories, journal articles, reading comprehension passages, poems, novels, and speeches, to read or listen to. This application also provides passage ranking for students to choose appropriate articles as well as the shadowing function for students to practice pronunciation. However, it is noted that students still have a right to choose other reading applications they like.

### 4.2.3 Procedure

The experiment began in October 2021 and lasted about nine weeks (Figure 4-2). It was divided into three stages.

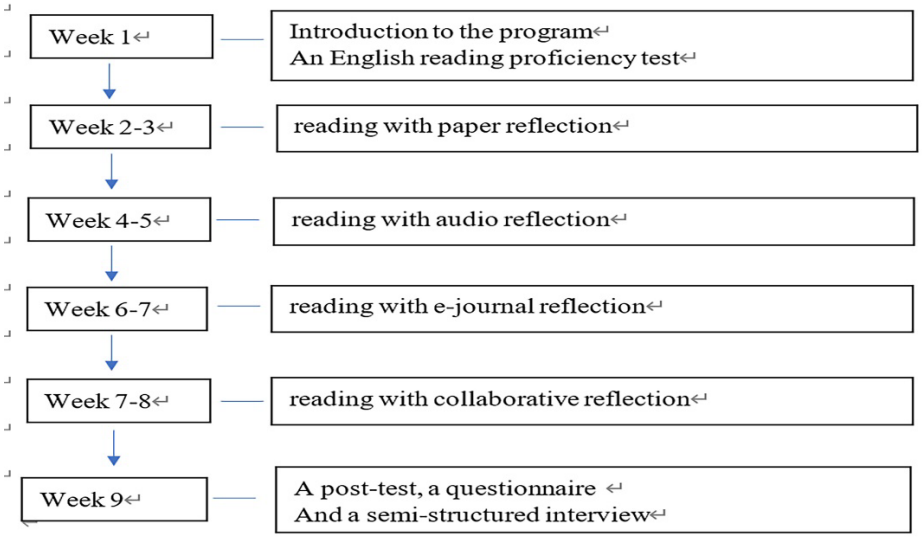


**Figure 4-2. The procedure of the experiment**

In the first week, the students were informed about this experiment's purpose and procedure. They were required to download the necessary smartphone applications and online learning platforms. In addition, a pre-test (see detail in 3.4) was conducted among all participants on their reading proficiency in the first week. Later, every two weeks, the students were asked to read two articles on the application and then complete one reading reflection in one mode assigned by the teacher. After eight weeks, the students completed four reflections in four different modes in order: paper journal, e-journal, audio reflection, and collaborative reflection. For the traditional paper journal, the students completed their reflections on paper and handed them in. For the e-journal, the students wrote their reflections in digital forms and then uploaded them to the Chaoxing platform. For the audio reflection, the students recorded their reflections with mobile devices and uploaded them to the Chaoxing platform. For the collaboration reflection, students were divided into 7 or 8 groups with 4 or 5 people in each group. For each group, each student read an article on the application individually and then reported what they read and reflected to other members. Later, they chose one or two best articles for group presentation through discussion. Their group presentation included their discussion process, reasons for their choice, and the article they chose. Then, the students uploaded their group reflection output (presentation) online, in written form or audio form, and shared their work with other groups.

After the final week (ninth week), a post-test (see detail in 3.4) was conducted to see whether the reading proficiency of participants improved. In addition, a questionnaire about students' perception and a semi-structured interview were conducted to see their perception of this mobile reading program and preferences for reflection mode.

### 4.2.4 Data collection

Data from the questionnaire,  the pre-test and the post-test, and the semi-structured interview were collected in this experiment.

The pre-test and post-test were all composed of three passages taken from College English Test 4 (College English Test or CET is a national English test in China that examines the English proficiency of undergraduate and postgraduate students in China. It includes two levels: CET4 and CET6). Passages in the two tests were different, but participants finished the same passages in each test. The tests consisted of two kinds of reading passages. The first two passages were standard reading comprehension passages with five multiple-choice questions for each, designed to test their understanding of details. The third passage, designed to see their textual and vocabulary understanding, required participants to fill in 10 blanks to complete the passage by choosing from 15 given choices. The total scores for both tests were 20 for 20 questions.

The questionnaire(Appendix III), designed by the researcher and composed of 6 multiple-choice questions and 10 5-point Likert scale questions, inquired about students' perception of the mobile-assisted reading program and reflective practices as well as mode preference. The questions contained four categories. The first category comprises two demographic inquiries focusing on age and the frequency of engagement in mobile learning. The second category consisted of four questions concerning students' perception of this mobile-assisted reading program. The third category contained eight questions probing into students' perception of the effect of reflection in the learning process. The last part consisted of two open-ended questions related to students' preferences for reflection mode.

The semi-structured interview was conducted based on students' responses to this mobile-assisted reading and reflective practice. Five interview questions (IQ) formed the foundation of the interview(Appendix III). The students answered the interview questions in Chinese after the experiment, and the teacher recorded their answers, and then transcribed and translated them into English.

### 4.2.5 Data analysis

Data analysis adopted a mixed method of quantitative and qualitative research.
The first source of data was the two test scores, which were analyzed qualitatively and quantitatively. For qualitative data, a descriptive analysis of score comparison was made between the two tests including the average score, the highest and the lowest score, and the score range. For the quantitative analysis, an independent t-test and Chi-square tests were employed to check whether gender influenced grade deviance. In addition, a paired t-test and effect size calculation were adopted to investigate whether there existed significant differences between the two test scores.

The second source of data was the data from the questionnaire, which was analyzed by both quantitative and qualitative methods. In the first stage, quantitative analysis was employed for the ten Likert Scale questions. One-sample Wilcoxon signed rank tests were conducted to examine whether the intervention of this mobile-assisted reading program affected students' perception. In addition, Chi-square tests were conducted again to examine whether gender differences would affect students' perception. In the second stage, qualitative analysis was adopted for all 16 questions (scale questions and multiple-choice questions) and descriptive data were obtained about students' perception and preferences.

The third source of data was the interview data, which was analyzed qualitatively. As the interview was composed of five questions, answers to each question were coded and recurring themes were identified among students' responses. Then the researcher examined the transcription carefully to locate subthemes or categories through repeated

ideas. The main themes were generally derived from students' general perception and subthemes were from students' explanations for their perception.

## 4.3 Results

### 4.3.1 Test results

The scores of the pre-test and post-test were computed and analyzed with SPSS software. An independent t-test was conducted first to investigate whether gender influenced grade deviance among male and female students. The result showed that the P values for both tests (.110 and .079) were above 0.05, indicating that there were no significant differences in grades between male students and females in both the pre-test and post-test.

Then score differences between the pre-test and the post-test were analyzed. The average score of the post-test (14.6) was 4.55 points higher than that of the pre-test (10.05). Besides, the lowest score (6) and the highest score (20) in the post-test were all higher than those (4 and 19) in the pre-test. Also, the pre-test scores ranged mainly from 6 to 12 while the post-test scores ranged mainly from 8 to 18.

In addition, a paired t-test was conducted and the result revealed a significant difference in scores between the two tests (P<.001, t=-8.057; Figure 4-3). Besides, the effect size of the two test scores was calculated. Cohen's d value was 1.28, an effect size showing that the average students scored significantly better in the post-test than in the pre-test.

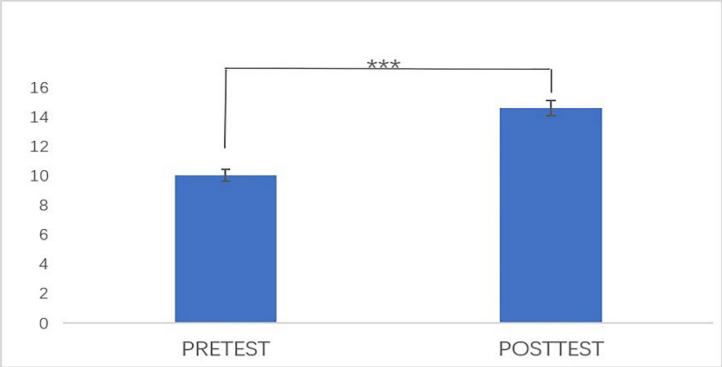



**Figure 4-3. Paired t-test between Pretest and Posttest**

### 4.3.2 Results of the questionnaire and the interview

The internal consistency and reliability of the questionnaire were tested by Cronbach's alpha coefficient. The result was 0.813, showing a high internal consistency of results from the 10 scale questions. Given the disproportion of female students to male students, Chi-square tests were conducted to examine whether gender differences would affect students' perception of the reading program as well as reflection. The result revealed

that the Pearson Chi-square significance value was above 0.05 for all ten scale questions, showing that gender was not significantly related to any of the questions.

**(1) Mobile learning habit**

Regarding their frequency of mobile reading(Q2), data from the questionnaire showed that 21 students (35%) read three times a week and 20 students (34%) read daily. Only 5 students (8%) read less than three times a week. This revealed that the students had accepted and formed a habit of mobile learning.

**(2) Students' perception of this mobile-assisted reading program**

For Likert scale questions in the questionnaire (Q3 and Q6)，one-sample Wilcoxon signed rank tests were conducted to examine whether the intervention of this mobile-assisted reading program affected students' perception (Table 4-1). Since the questions were 5-point Likert scales, the null hypothesis were that the median score was 3, which indicates a zero effect of the intervention process. Results showed that for students' general evaluation of this program(Q3), the null hypothesis was rejected at a significance level of 0.05 (P=0.000), indicating students considered this program effective. However, for their understanding of the need for process management or supervision by teachers (Q6), the null hypothesis was not rejected (P=0.88), indicating that students regarded process management as ineffective.

**Table 4-1. Perception of the effectiveness of the mobile-assisted reading program**

| Item | N | M | SD | Null Hypothesis(NP) | Sig. |
|---|---|---|---|---|---|
| Q3 | 60 | 4.00 | 1.105 | The median of Q3 equal 3 | .000*** |
| Q6 | 60 | 2.73 | 1.260 | The median of Q6 equal 3 | .088 |

(*P< .05, **P< .01, ***P< .001)

For questions concerning the perception of this mobile-reading program in the questionnaire (from Q3 to Q6), a descriptive analysis was made to explore students' understanding. Regarding general opinions about the effect of mobile-assisted reading(Q3), 42 students (70%) approve of the learning effect of this mode, 12 students (20%) remained neutral and another 6 students (10%) expressed disapproval. In their learning gains (Q4), 33 students (55%) believed they improved in speaking and listening. Also, 24 students (40%) thought their reading proficiency was improved. Only 9 students (15%) believed their writing ability got improved. For future use (Q5), 42 students (70%) of students expressed their willingness to employ this mode in future study, while 6 students (10%) expressed their objection. As to the necessity of teachers' supervision or process management measures in the mobile-assisted reading program(Q6), 23 students (38%) expressed disapproval while 15 students (25%) lent support to it. Another 22 students (37%) remained neutral.

In the interview, the students were asked to explain their opinions about the necessity of process management or supervision (IQ1). Three themes were identified concerning students' perception: (a) positive perception; (b) negative perception; and (c) neutral perception. Seven students supported reflection as a way of monitoring the learning process and one disagreed with it. Another two students thought that depended on students' interests or preferences.

For students who supported process management, two subthemes were identified among their responses: (1) multifunction of mobile devices; and (2) loose supervision of the check-in service.

*S3: I think it is necessary. Mobile devices serve various functions such as watching films or communicating with others. Therefore, if students don't have strong self-control, they might indulge themselves in playing on mobile devices rather than devote themselves to reading on apps (1).*

*S4: Necessary. Without proper supervision and management, students may skip the reading for various reasons such as negligence or lack of time (2).*

*S6. If students are required to check-in only, maybe they will only do the check-in without reading the passage (2).*

For students who disfavored process management, two subthemes were identified among their responses: (1) the freedom to study at will; and (2) convenience and casualness.

*S1: I don't think you need to supervise this learning process intentionally. One advantage of mobile reading is that it allows students the freedom to study at will. Convenience and casualness, two main features of mobile reading, are thus lost under the supervision of mobile reading (1,2).*

For students who remained neutral, two subthemes were identified : (1) the interest; and (2) the preference of individual students.

*S2: That depends. Well, if one is interested in it, he doesn't need to be monitored (1).*

*S5: That depends. Some people like reading by nature while others dislike reading since they were young. In addition, different people favour different kinds of reading passages (1, 2).*

**(3) Students' perception of the effect of reflective practice**

For Likert scale questions in the questionnaire (Q7 to Q14), one-sample Wilcoxon signed rank tests were conducted to examine whether the intervention of reading reflection affects students' perception (Table 4-2). Results showed that for all eight questions, the null hypotheses were rejected at a significance level of 0.05, indicating that students perceived the reading reflection as effective in the learning process.

**Table 4-2. Perception of the effectiveness of reading reflection**

| Item | N | M | SD | Null Hypothesis(NP) | Sig. |
|---|---|---|---|---|---|
| Q7 | 60 | 3.57 | 1.155 | The median of Q7 equal 3 | .000*** |
| Q8 | 60 | 3.42 | 1.253 | The median of Q8 equal 3 | .014* |
| Q9 | 60 | 3.85 | 1.117 | The median of Q9 equal 3 | .000*** |
| Q10 | 60 | 3.90 | .969 | The median of Q10 equal 3 | .000*** |
| Q11 | 60 | 3.85 | 1.482 | The median of Q11 equal 3 | .000*** |
| Q12 | 60 | 4.15 | 1.039 | The median of Q12 equal 3 | .000*** |
| Q13 | 60 | 3.53 | 1.455 | The median of Q13 equal 3 | .011* |
| Q14 | 60 | 3.87 | 1.186 | The median of Q14 equal 3 | .000*** |

(*P< .05, **P< .01, ***P< .001)

For questions concerning the perception of reading reflection in the questionnaire (from Q7 to Q14), The researcher still adopted the descriptive analysis. The first four questions were related to the positive effect reflection may bring to students (Table 4-3). For the stimulative effect in learning (Q7), 30 students (50%) reported a positive effect of this mode upon stimulating reading, 11 students (18%) said it had little effect, and 19 students (32%) remained neutral in attitude. For the learning interest (Q8), 29 students (48%) stated that their interest had been promoted, while 14 students (23%) reported disagreement and another 17 students (28%) remained neutral. For passage understanding (Q9), 40 students (67%) agreed that their reflective journals helped them understand passages better, while 8 students (13%) disagreed with the opinion and another 12 students (20%) remained neutral. For the reflective and summarizing abilities (Q10), 42 students (70%) held that they had developed their reflective and summarizing abilities by completing reflections, but 5 students (8%) disagreed. Another 13 students (22%) remained neutral.

**Table 4-3. The positive effect of reflection**

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Q7 | 2(3.3%) | 9(15%) | 19(32%) | 13(22% ) | 17( 28%) |
| Q8 | 5(8%) | 9(15%) | 17(28%) | 14(23%) | 15(25%) |
| Q9 | 2(3.3%) | 6(10%) | 12(20% ) | 19(32%) | 21(35%） |
| Q10 | 1(17% ) | 4(7%) | 13(22%) | 24( 42% ) | 18(30%) |

（1=strongly disagree， 2= disagree， 3=neutral， 4=agree， 5=strongly agree）

The next four questions were about the possible negative influence of reflection (Table 4-4). Regarding reading skills or knowledge (Q11), most students (70%) thought it helped improve their reading skills or knowledge, while 14 students (23%) expressed disapproval. Regarding the study load (Q12), 46 students (77%) agreed that it was not

a heavy study load, and only 4 students (7%) considered it a heavy load. For the inconvenience of operation (Q13), 36 students (60%) of students thought uploading and typing were not troublesome while 16 students (27%) held it inconvenient. Regarding the necessity of discussion after reading (Q14), 42 students (70%) thought discussion after reading was necessary, but 8 students (14%) held opposite opinions. Another 10 students (16%) remained neutral.

Table 4-4. The negative effect of journal writing

| | **5** | **4** | **3** | **2** | **1** |
|---|---|---|---|---|---|
| Q11 | 31(52%) | 11(18%) | 4(7%) | 6(13%) | 8(10%) |
| Q12 | 29(48%) | 17(28%) | 10(17%) | 2( 3% ) | 2(3%) |
| Q13 | 21(35%) | 15(25%) | 8(13%) | 7( 12%) | 9(15%) |
| Q14 | 22(37%) | 20(33%) | 10(16%) | 4(7%) | 4(7%) |

（5=strongly disagree， 4= disagree， 3=neutral， 2=agree， 1=strongly agree）

In the interview, two themes were identified: (a)positive perception, and (b)negative perception. most of them (9 students) considered it a useful experience in the learning process with one student disapproving of this practice. For students who supported reflection after reading, five subthemes were identified among all reasons: (1) promotion of passage understanding; (2) understanding of their learning; (3) deepening the memory; (4) internalization of knowledge; (5) accumulation process in reading.

*S1: If you only read without reflection, then you only receive the message in the article, nothing else, without any meaning(1).*

*S2: reflecting on the words or texts can enhance or promote the understanding of the article, a very important part (1).*

*S3: If the reflection is not a required task, I think it would be beneficial. You can help yourself understand the writer's message better and help us understand our thoughts better (2).*

*S4: I thought reflection may deepen our memory about what we read. Nowadays we receive all kinds of messages and we are likely to be forgettable more than ever (2).*

*S5: Reflection is the internalization of knowledge, which can help us better understand the structure and inner meaning of the passage (4).*

*S6: If you don't write a reflection, you will not know how much you remember or how much you understand (3).*

*S7: Reflection is part of the reading process, in my opinion, an accumulation process. It is necessary as I will not know what I read after one day if I didn't make any reflection (3, 5).*

Only one student expressed negative perception of reflection in reading. She attributed it to the fact that the type of materials she read didn't inspire deeper thought in her.

*S9: I dislike reading reflection. The news I read didn't lead to deep impressions and reflection.*

**(4) Students' preferences for reflection mode**

In the questionnaire, two questions were asked concerning students' preferences for reflection modes. Regarding their favourite mode (Q15), the most preferred mode was traditional paper journal (27 students, about 45%), and audio reflection came next (19 students and 32%). E-journal (7 students, about 12%) and collaborative reflection (12 students, about 20%) gained relatively low popularity. As to their least favoured mode (Q16), the most unpopular mode was collaborative reflection (26 students, about 43%), and e-journal and audio reflection came next (12 students, about 20%).

In the interview, students were also asked to rank the four modes of reflection and explain their choices. Paper journal reflection received unanimous positive comments whereas e-journal reflection generally received negative comments from interviewees. Collaborative reflection and audio reflection both received a mixture of positive and negative comments.

For paper journal reflection, four themes were identified among students' responses : (a)deeper memory and thought; (b) spelling practice; (c) casualness and convenience; and (d)internalization of knowledge.

*S3: I prefer paper journals the most. I can record what I read and deepen my memory through it. Also, paper reflection can convey your thoughts better. In addition, writing things on paper is more casual and real than typing them on screens (a, c).*

*S4: I like paper reflection the most. I feel it is convenient and kind of ceremonial(c).*

*S5: I prefer paper reflection the most, and audio reflection comes next。 I think the two are similar in that they are the organization or internalization of knowledge in our minds(d).*

*S10: I prefer paper journals. Paper reflection helps practice spelling. Paper reflection and audio reflection can be combined to practice multi-skills such as listening, speaking, and spelling(b).*

For collaborative reflection, six themes were identified: (a)sharing of ideas; (b)sense of participation; (c)promotion of understanding. But some problems were also identified: (d) problems with reading materials; (e) time and place; and (f) engagement problems.

*S1: I like collaborative reflection the most. It involves the sharing of ideas among different group members. The fierce discussion and the clash of ideas will benefit group members a lot(a).*

*S2: I think the best one would be collaborative reflection. Well, because in the process of discussion, you may think about the problem from your perspective and other people's perspectives. Such activities bring a sense of participation. In all, we may promote our understanding by being exposed to various thoughts and understandings (a, b, c).*

*S4: People read different articles, which makes it hard to discuss and reflect. Also, the time and the location of discussions are problems worth our attention. We need to find the proper time and places that are acceptable for all group members(d, e).*

*S7: For collaborative reflection, if all members can record their opinions for sharing and then make a summary after the discussion, it will be beneficial. But if only the person who is responsible for the presentation does the work, it will not be effective in promoting reading(f).*

For audio reflection, three themes were identified among all ideas : (a) adaptability (b) multi-functions; (c) location constraint.

*S2: I think talking will be more logical than writing. For audio reflection, you can redo it or reorganize it if you feel a certain part is not satisfactory or perfect. You can also revisit it after some time to see your previous ideas(a).*

*S10: paper reflection and audio reflection can be combined to practice multi-skills such as listening, speaking, and spelling(b).*

*S4: If you reflect by recording your understanding, you must consider the location problem. For example, the library will not be a good place to make audio reflection(c).*

For e-journal reflection, most students (9) regarded it as the least favoured mode and one student didn't give a response to it. Six themes were identified among all ideas: (a)spelling problems; (b)depth of reflection; (c) impersonality; (d) uselessness; (e)storage problems; and (f) inconvenience.

*S2: The last one would be e-journal reflection because it is more impersonal. if you always rely on it, then you may forget how to spell words (a, c).*

*S3: For typing, you will always consider what you will say next during the typing process, and I kind of dislike it (b).*

*S4: The problem with it is that we may delete the reflection we stored in the smartphone or mobile devices or lost it because we forget where we store it(e).*

*S5: E-journal reflection is the least preferred mode for me. One problem with it is the prompting function. The other is that typing is not suitable for long passage reflection as I can't figure out the logic between paragraphs when typing. I feel typing is only suitable for short notes, not long reflections (a, b,).*

*S7: E-journal reflection is not useful(d).*

*S8: typing is inconvenient on mobile devices(f).*

**(5) Students' perception of problems and suggestions in the program**

In the interview, participants were also interviewed about problems they encountered in the mobile reading program. Four themes were identified among their responses: (a)distraction; (b)difficulty in finding suitable reading materials; (c)cultural differences; and (d) lack of interest.

*S1: The distraction problem. Mobile devices perform various functions such as communication, entertainment, work, and study. Then it is hard for you to focus on reading with such multi-function devices. There are also too many learning resources online and it is hard to find suitable reading materials (a, b).*

*S4: The most serious problem for me is the vocabulary problem, which greatly hindered passage understanding(b).*

*S5: The thinking logic and ways of expression are different between English and Chinese, which also caused trouble for the passage understanding(c).*
*S2: As we are busy with studying or other things, we don't spare too much time reading that stuff. people are not very interested in it, to be honest(d).*

Then students were invited to give some suggestions to cope with those problems. Three themes were identified among all suggestions: (a) the way of reflection (b) the requirement of reflection; (c) the choice and scaffolding of articles.

*S1: For reading reflection, I think it can start from individual reflection by reflecting on what you gain and get from the passage. Then a group discussion may be held for a group reflection to understand from different perspectives. After that, a class reflection may be carried out to summarize the different ideas for inspiration. Such a multi-layer reflection process will benefit a lot I think(a).*
*S3: I think in each group, group members can make a mini presentation about what they read so that others can have a rough understanding of it and maybe develop an interest in the book later. Also, besides written reflection or presentations, we can use video materials to complement the reading process(a).*
*S5: I recommend a gradual learning process starting from writing fragmented short notes. After some practice, students may start to write long reflections with logic(a).*
*S4: I think for reading reflection, requirements like time and length should not be stipulated. Students should be encouraged to write at will(b).*
*S6: I think if reflection is a voluntary activity, not a compulsory assignment, we may enjoy the process more and participate more actively in it(b).*
*S3: My suggestion is that we should give students more choices on the kinds of articles they read. Different students may prefer different kinds of stories(c).*
*S10: I think it is useful to add some comprehension questions for the reading articles(c).*

## 4.4 Discussion

### 4.4.1 Students' perception of reflective practices in this mobile-assisted program

For SRO2_1 (students' perception of reflective practices in this mobile-assisted reading program), the results of the questionnaire and interview revealed how students perceived reading reflection in the learning process.

Concerning students' perception of the need for process management and supervision in the mobile-assisted reading program, the questionnaire reported a mixed result: 38% (23) in disagreement, 25% (15) in agreement, and 37% (22) in neutrality. The interview results also indicated that many students recognized the importance of reflection in the mobile reading process but disproved its role as process supervision by teachers. All these showed monitoring or supervision by teachers such as journal writing was not considered necessary in mobile reading. This conclusion partially concorded with Bulpitt and Martin's study (2005) that guided reflection and reflections under supervision are variable processes so they may not bring help to learners. However, scholars like Sidhu et al (2010) also indicated that reflective journals were useful in helping students monitor their learning. As for this function, future studies may explore

more flexible ways to integrate diverse reflective methods and forms into the assessment to achieve better learning results without giving students too much pressure.

In terms of perception of the stimulation and learning interest, questionnaire data showed roughly 50% (30) held that reflective practices were effective in stimulating reading and improving their learning interest, with about 20% (12) disagreement. In addition, almost 70% (42) of all students believed that reflection promoted passage understanding and helped cultivate their reflective and summarizing abilities. This is in accordance with previous research that reflective journals are beneficial for SLA purposes, especially for cognitive development in the writing and reading process (Chang & Lin, 2014).

As for the possible negative influences of reflection upon learning, students, however, didn't report being greatly affected by the questionnaire. For example, 42 students (70%) agreed reflective journal improved their reading skills or knowledge. In addition, over 36 students believed (abo ve 60%) that completing reflection is not a heavy load and the operation of typing and up-loading is not inconvenient. Furthermore, discussion after mobile reading is also considered important (about 42, 70%).

In the interview, students presented five reasons for their approval of reflection in mobile reading: (1) promotion of passage understanding; (2) understanding of their learning; (3) deepening the memory; (4) internalization of knowledge; (5) accumulation process in reading. Only one student disapproved of it for the lack of deeper reflection in the passages read.

These findings from the questionnaire and the interview were in line with most previous research that positive perception of reflection overwhelmed negative perception among students (Kessler, 2021; Rolfe, 1997; Shoffnen, 2009; Bulpitt & Martin, 2005). Common negative views such as extra workload(Kessler, 2021), boredom, and consumption of time and effort (Rolfe, 1997; Bulpitt and Martin, 2005) were not reported in this study.

### 4.4.2 Students' preference for reflection mode

For SRO2_1(students' preference for reflection modes), the questionnaire results revealed students' preferences. For the most favored mode, the top two were paper journal reflection (27 students, 45%) and audio reflection (19 students, 32%).

In the interview, students explained their preference for various modes of reflection. For paper journal reflection, they favored it for reasons such as deeper memory and thought, spelling practice, casualness and convenience, and internalization of knowledge. Some students further suggested a combination of paper journals and audio reflection to practice multi-skills during the reading process. This preference aligned

with the research of Fortunati &Vincent (2014) about the preference for paper writing over e-writing because students considered paper writing as being more multi-sensorial and metacommunicative than the use of the keyboard or screen. But very few studies have examined the perception of different modes of reflective practices in mobile reading, esp. the comparison of paper journal reflection with other modes of reflection, which made the study unique in this aspect. This research result was partially consistent with Falk-Ross' study (2012) of preservice teachers' use of various modes of reflection that students preferred printing because of its easy access to reviewing the reflection compared with video or recorded reflection. Shoffney (2009) also discovered that the type of technology preservice teachers chose for reflection was primarily based on familiarity rather than challenge or novelty for new learning.

Concerning the audio reflection, students favoured it for its adaptability as students noted they could make the recording at any place or time and then repeat the recording process until satisfied. Students also mentioned another benefit of audio reflection as being able to practice speaking, listening, and writing at the same time. Fitt (2018) suggested that Audio recording is more mobile in expressing thoughts and emotions than diaries. Leinonen et al. (2016) also described audio recording as ease of operation and time-saving. However, studies that examined the use of audio recording as a reflective approach in classrooms are very limited as students in this study suggested the primary benefit of audio reflection was the practice of speaking skills rather than the cultivation of metacognitive skills. In addition, some of the audio reflections in this study might lose spontaneity as students wrote down their reflection content first and then recorded it several times, as was noted by Chan & Wong (2021) that students were so conscious of the recording process that they carefully considered and planned the recorded reflection.

For the most disfavored mode, the top two were collaborative reflection (26 students, 43%) and e-journal/recorded journal (12 students, 20%). As audio reflection was confirmed as one of the top two favourite modes in both the interview and the questionnaire, we here considered collaborative reflection and e-journal as the two least favoured modes.

For the unpopularity of the collaborative reflection, students reported the problem of engagement as most of the reflection output could be done by one group member. Others reported it was hard to discuss and reflect as they read different materials in collaborative reflection. Also, the time and location of the discussion were a problem worth our attention since they needed to find a time and place that were acceptable for all group members. Yet interview results also showed that students noted the necessity of collaborative reflective activities such as discussions or group work after reading, which was consistent with findings of previous studies that collaboration in reflective practice led to shared experience and easy reflection (Chan &Wong, 2021; Falk-Rose,

2012; Shoffner, 2009). Two reasons might account for the negative attitudes of students in this study. Firstly, the passages students read on mobile applications were diverse and it was hard for them to have a thorough discussion. In addition, the design for collaborative reflection required students to upload their reflective process and output online, which might bring extra load and inconvenience and then discourage students. As Shoffner (2009) indicated convenience was regarded as one of the key factors for students' choice of reflection mode. Future research may continue utilizing the potential of collaborative reflection by constructing a more convenient and motivating collaboration design allowing for better communication and group engagement

For dissatisfaction with e-journals, lack of practice in spelling, and less reflection ranked as the top two reasons. These findings echoed partially with Lee (2020) that e-writing on smartphones led to reduced production and limited students' abilities to express themselves fully. Yet the finding was in contradiction with Chan & Wong's discovery (2021) about the preference for reflective e-journals over audio and video reflection. The researcher attributed the discrepancy to the fact that most students in this research lacked the experience of digital writing and editing as they were students in the first year and were novel to online writing and editing. Another possible explanation for it might be the influence of age and learning stage as participants in this study were students majoring in English in the first year and their age differences were not distinct whereas participants in Cecilia's study involved students from Year 1 to Year 4. Previous studies reported that experienced learners may consider writing as a more effective way to reflect on oneself while novice learners may be more inclined to audio and video reflection (Bye et al., 2009; O'Reilly & Milner, 2020).

### 4.4.3 The effect of the program on promoting language performance

For SRO2_3 (the effect of the program on students' language performance), the results of the questionnaire, tests, and interview revealed the effect of this mobile reading program on students' perception and language achievement.

For students' perception, questionnaire results indicated that students (42 students, 70%) generally considered the mobile-assisted reading program effective in improving their language skills. Speaking (33, 55%), listening (33, 55%) and reading (24, 40%) were three major areas of improvement. In addition, as high as 70% (42 students) believed that they would employ this mode for future study, with 10% disapproval of future use. This positive attitude indicates huge potential for mobile-assisted reading. At the same time, students also reported some problems encountered in this mobile learning program such as distraction and difficulty in finding suitable materials, etc. in the interview.

For students' language achievement, it could be observed from the analysis of test scores. Students' language achievement improved in terms of the average score, the

lowest score, the highest score, and the score range. The paired t-test result indicated a significant difference (P< .001, t=-8.057) between the two scores. In addition, the effect size of the two test scores is about 1.2, significant enough to indicate improvement for average students.

The results provided evidence that the mobile reading program or reflective practices might contribute to the cultivation of students' reading proficiency. It is somehow consistent with other previous literature (Klimova & Zamborova, 2020; Schwendimann et al., 2018). However, we are aware that the improvement can be caused by other factors due to the experiment design. First, allowing for the equality of educational opportunities, there is no control group in the program. As a result, the improvement might be the result of multiple factors such as class instruction, gains from other English classes, mobile reading, or students' autonomous learning. Second, the two tests didn't adopt the same comprehension passages. Although the passages were all taken from CET 4 (College English Test 4), the slight variation in difficulty might influence students' test scores.

### 4.4.4 Implications of reading reflection and reflection modes

Findings about students' perception of and preference for reflection are significant for app developers and educators.

Few MALL apps currently offer reflective activities for their users, despite learners' desires for scaffolding, reflection, and personalized feedback on their learning process (Kim et al., 2016) Those who provide the reflection function provide simple ways to conduct reflective activities (such as notetaking or e-journal). This makes the integration of convenient, reflection-type activities into MALL possible and promising. Studies about the effect of reflection modes adopted by Apps are few. As revealed in the current study, the reflective activities could add functionality as well as simultaneously help learners reflect and recollect what they experienced and learned. Therefore, app developers might consider experimenting with proper modes of reflective practices to stimulate reflection and cultivate the target user's interest and stickiness. Firstly, some preferable modes may be offered to cater to more learners to conduct reflective activities. As recording, video, or picture of paper journals are easy to handle and upload, those modes might be given more opportunities in app designing. Secondly, we also believe encouragement or stimulation may be offered for good reflection learners accomplished, which may lead to a personalized environment and stronger stimulation in learning, eventually resulting in user stickiness (Petsilas et al., 2020).

Apart from app developers, such insights into the perception of reflection and reflection mode may also help teachers in designing reading programs. Reflection was not always a positive experience. As revealed in this study, nearly 30 % of the students disapproved

of it. Therefore, from the perspective of teachers, the development of a reflective environment is of great importance and appropriate support (technical and instructional) should be provided before and during the learning process (Falk-Ross, 2012; Bulpitt & Martin, 2005). As also indicated in this study and previous studies, convenience and familiarity are priority factors students consider in their choice of reflection mode (Shoffner, 2009). Accordingly, If teachers wish to facilitate students' learning in MALL with reflective practices, then unlike traditional singular reflection requirement (paper journal or e-journal), teachers, based on the understanding of students' learning experience and possible preferences, may provide two or three popular modes (such as traditional paper journal, audio reflection or collaborative reflection) for students to reflect on whatever convenient channel to them(O'Reilly & Milner, 2020; Shoffner, 2009; Falk-Ross, 2012). In addition, teachers may take the learners' age or learning content into consideration and suggest more appropriate modes for students since previous studies indicated that learners with different ages/levels may prefer different kinds of reflection modes (O'Reilly & Milner, 2020). Thirdly, teachers should be cautious when adopting reflection as a supervision or process management method since many students still preferred mobile reading as a kind of autonomous study and didn't like to be controlled or supervised as findings in this study indicated. Accordingly, reflective tasks can be flexible in times, length, and forms to allow for freedom on students' part. For example, the frequency may be a semi-frequent, bi-monthly basis, or even more sparing basis (Ahmed, 2020; Kessler, 2021). Fourthly, As students in the interview reported difficulties in finding suitable resources and reading without purpose, some scaffolding and recommendations can be given for mobile reading programs such as the topic range and understanding questions, which may help students concentrate and grasp the reading materials better (Ahmed, 2020; Jarvis & Baloyi, 2020). Fifthly, some positive comments toward collaborative reflection in the interview showed that reflection should be interactive, but improper design or implementation may lead to unsuccessful communication and collaboration. Therefore, collaboration reflection should be designed carefully in advance to suit the program and students. For example, students suggested in the interview collaboration should be implemented at different levels (personal level, group level, and class level). Also, some constructive scaffolding questions may be provided as the basis for discussion as previous studies indicated (Jarvis & Baloyi, 2020). Sixthly, records of students' learning behaviour on apps can be collected and used. This kind of data was not included in this research, but previous studies revealed that the intention to use check-in services in mobile English learning was positively related to usage behaviour as well as students' attitudes and behavioural control in mobile learning check-in service (Cheon et al., 2012; Nie et al., 2020). Therefore, the researchers believed that the adoption of such data could help teachers understand students' usage behaviour on apps and then adjust the program for better learning effects.

## 4.5 Conclusion

The current study investigated college students' perception of mobile reading and reflection as well as their preferences for reflection modes in a mobile reading program. Its findings revealed that learners generally considered mobile reading programs beneficial for their language learning process. The reflective practices adopted can stimulate their learning interest, promote understanding, and cultivate reflective and summarizing abilities without a heavy study load and inconvenient operation. Yet students didn't consider reflection a good way of process management and supervision. The most favoured journal mode is paper journal reflection and audio reflection, while collaborative reflection and e-journal reflection remained the least two favoured reflection modes. Based on students' perception of reflection and reflection mode in the mobile reading, some implications were put forward concerning the application of reflective activities in app design and course design. For app developers, some preferable reflection modes facilitated with stimulative measures may be offered to cater to more learners to conduct reflective activities. For language teachers, based on the understanding of students' age, learning experience, and possible preferences, they may create a good reflective environment with technical and instructional support, and then provide two or three popular modes for students to reflect on whatever they read.

Due to limited literature about learners' perception of reflection in mobile learning, this study enriched current literature about the applicability of various reflection modes from learners' perspectives. The findings could help educators design and implement programs in which reflection functions as a vital component of promoting learning. The findings could also enlighten app developers on integrating reflective activities in their apps.

The present study is limited in several aspects. Firstly, the study didn't adopt a comparative study of the control group and the treatment group, which makes the analysis of students' learning gain less rigorous. Secondly, the study mainly investigated students' attitudes toward different modes of reflection, but the content and quality of reflection were not analyzed. Thirdly, data about students' learning behaviour was not collected. Fourthly, the sample size was not large enough and participants were limited to students in language majors with more females than males.

## 4.6 Summary of this chapter

In this chapter, we reported the design and result of a mobile reading program supported by reflection. Four modes of reflective practices were utilized in a mobile reading program to explore students' perception of its function and preferences for reflection modes. The questionnaire and interview results revealed that students favoured reflective practices as a good way to stimulate interest, deepen understanding and

promote reflective and summarizing abilities, but they didn’t consider it a good method to monitor the learning process. In addition, most students favoured traditional paper reflection and audio reflection, while collaborative reflection and e-journal reflection received the least support. The pretest and posttest of students showed a significant difference in their reading proficiency. The findings about students' perception of reflection and preferences for reflection modes will be adopted in the designing of a reflective learning model in the following chapter.

# Chapter 5 Designing a reflective learning model for English reading supported by mobile technology

In this chapter, building upon the experimental findings from Study 1 and Study 2, we propose a new reflective learning model for English reading supported by mobile technology. Then we designed an experiment to evaluate the feasibility of the learning model among students. In the experiment, we utilized an experimental group and a control group to assess the impact of the model on students' learning achievement. Furthermore, we utilized a range of data sources such as questionnaires, interviews, reflective journals, and writing assessments to track the learning process, evaluate students' self-regulation and critical thinking skills, and enhance communication between teachers and students.

## 5.1 Research introduction

The findings of Study 2 demonstrated the effectiveness of reflection in enhancing motivation and facilitating understanding in mobile English reading. However, the role of reflection in process management was found to be somewhat limited, as was also suggested in Study 1. Moreover, we also gained insight into students' preference for reflection modes and reading materials. Building on this understanding, we devise a reflective learning model for reading that incorporates reflection into the entire learning process rather than solely focusing on post-reading activities. This model will enable both students and teachers to utilize reflection for multiple purposes, such as documenting learning progress, aiding in self-assessment, enhancing language proficiency, and fostering deeper engagement, rather than using it solely for instructional monitoring. This model also empowers learners to customize their learning experience by choosing their preferred reflection mode and reading materials.

Study 3 is expected to meet the third subordinate research objective (SRO3).
SRO3: to design a reflective learning model for English reading supported by mobile technology and examine the effectiveness of the proposed learning model in improving students' reading proficiency, self-regulated learning, and critical thinking skills.

SRO3 will be achieved by pursuing two specific research objectives.
SRO3_1: to design a reflective learning model for English reading
SRO3_2: to test the effectiveness of the proposed learning model upon students' learning gains

## 5.2 A reflective learning model for English reading supported by mobile technology

Drawing from insights from Study 1 and Study 2, a reflective English reading learning model, supported by mobile technology, is formulated to enhance students' learning outcomes. The researcher designed the proposed model with reference to Cowan's

(1998) Reflection diagram, incorporating mobile devices to facilitate effective reflective English reading. Cowan's model served as a reference in designing the model due to its simplified reflection process. The researcher believes that the simplified reflection process and clearly classified activities in each stage assist learners in grasping the relationship between theoretical concepts and empirical reality, as highlighted by Amrullah (2020). Moreover, the three primary stages of reflection roughly correspond to the general language learning cycle observed in college students: pre-class preparation, in-class learning, and post-class reflection.

In the proposed model, the three stages of reflection are integrated into the three language learning stages supported by mobile devices. The following are the proposed learning model and the detailed learning procedure supported by mobile technology.

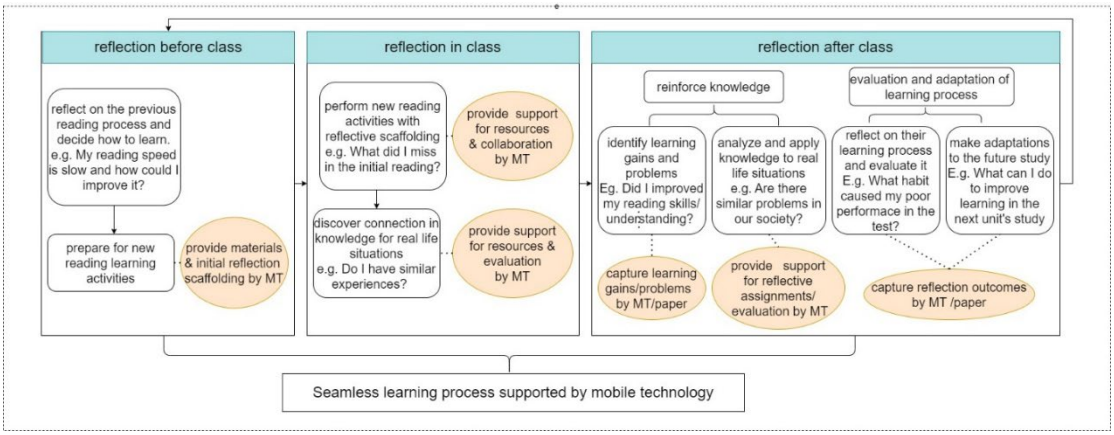
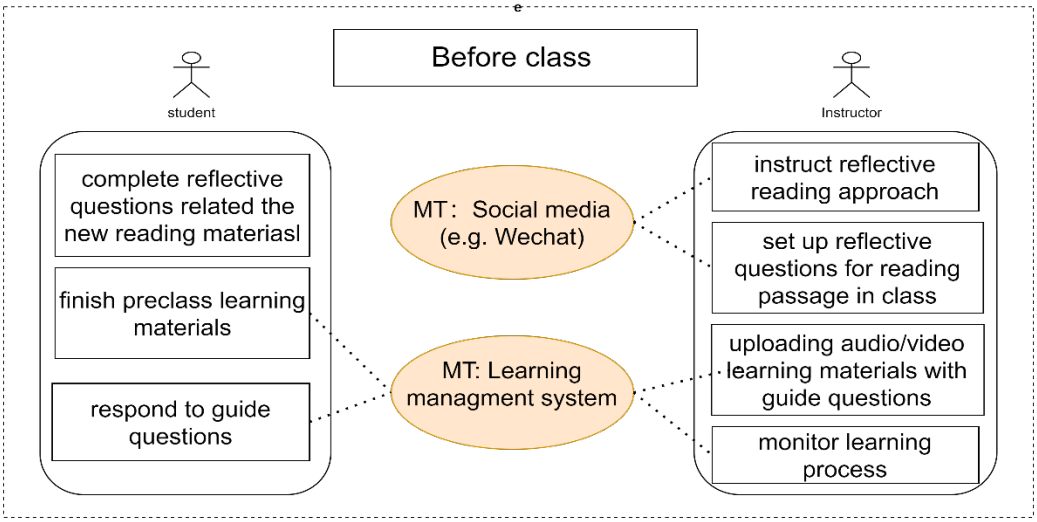
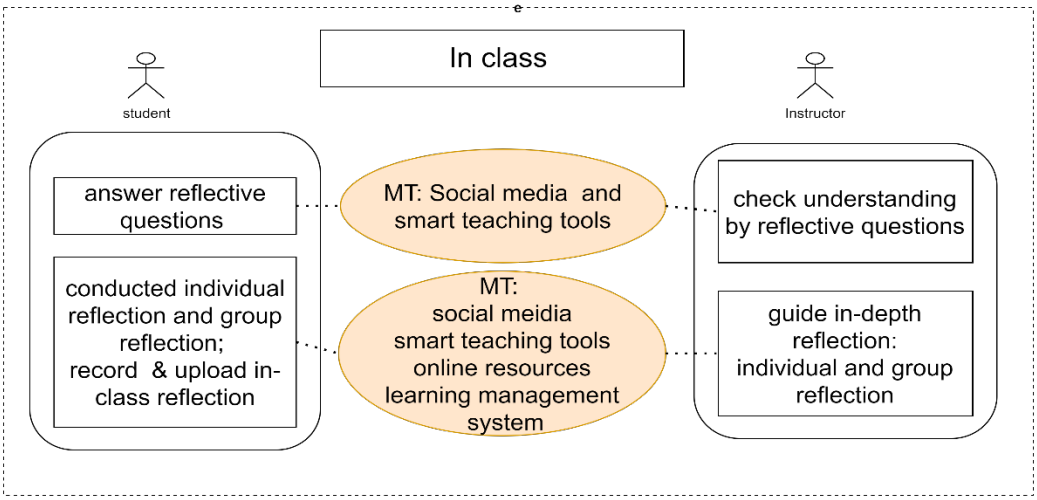



**Figure 5-1. A proposed reflective learning model for English reading supported by mobile technology**


Before class
student
Instructor
complete reflective questions related the new reading materiasl
finish preclass learning materials
respond to guide questions
MT： Social media (e.g. Wechat)
MT: Learning managment system
instruct reflective reading approach
set up reflective questions for reading passage in class
uploading audio/video learning materials with guide questions
monitor learning process


In class
student
Instructor
answer reflective questions
conducted individual reflection and group reflection;
record & upload in-class reflection
MT: Social media and smart teaching tools
MT:
social meidia
smart teaching tools
online resources
learning management system
check understanding by reflective questions
guide in-depth reflection:
individual and group reflection

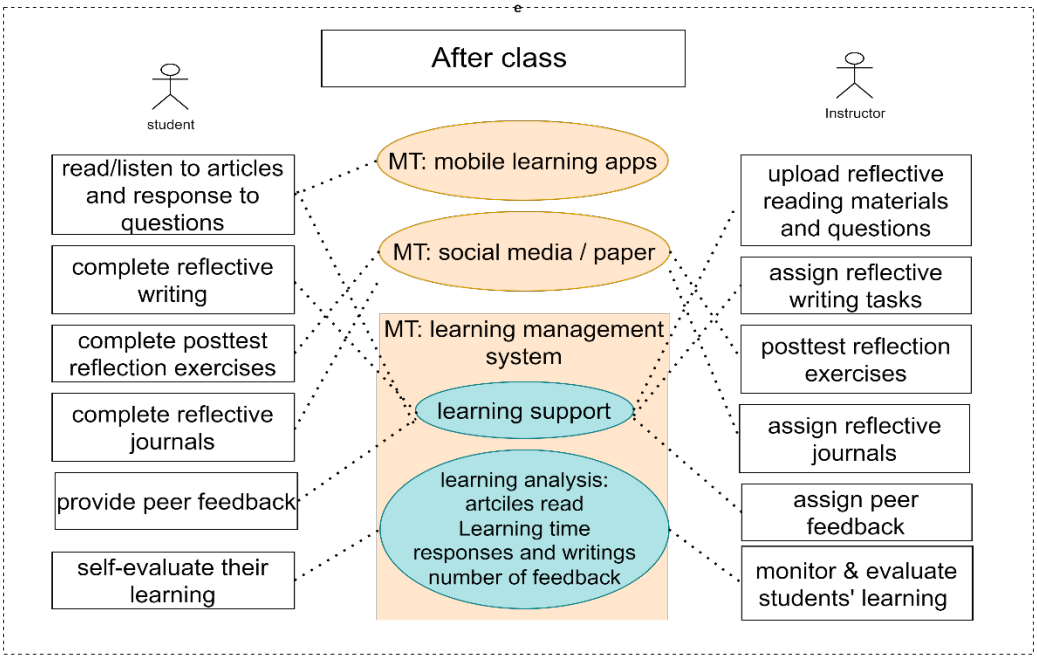

After class
student
Instructor
read/listen to articles and response to questions
complete reflective writing
complete posttest reflection exercises
complete reflective journals
provide peer feedback
self-evaluate their learning
MT: mobile learning apps
MT: social media / paper
MT: learning management system
learning support
learning analysis:
artciles read
Learning time
responses and writings
number of feedback
upload reflective reading materials and questions
assign reflective writing tasks
posttest reflection exercises
assign reflective journals
assign peer feedback
monitor & evaluate students' learning

**Figure 5-2. The support of mobile technology for reflection in the three stages**

The proposed learning model differs from other models in four aspects. Firstly, reflection is implemented in all the three stages of the learning process instead of only focusing on the reflection after the learning as many previous studies did. Secondly, Mobile technology is seamlessly integrated throughout the learning process to underscore reflective learning, contrasting with other studies that predominantly explore the supportive role of information technology, like online learning environments. Thirdly, unlike many abstract reflective models, this model is concrete in that it designed detailed learning guideline and strategies for each learning stage in English reading classrooms. Both teachers and students can adopt it to guide their language learning/teaching for specific skills.

## 5.3 Research method

### 5.3.1 Experimental setting and participants

We applied the proposed model in an experiment to test its effectiveness. This experiment was conducted in two classes majoring in English Major in Dalian Polytechnic University in the fall of 2023. The experimental group of class 1 comprised 29 students, with 26 girls and 3 boys. The control group of class 2 comprised 28 students, with 26 girls and 2 boys. However, one student didn't conduct the pre-questionnaire and therefore was removed from the participants. Most participants were women because language majors were generally more popular among women than men. They were all college students in their first year and had learned English for over six years. The average age for both classes was 18. The experiment group performed a little better in the pretest, but no significant differences were found between the two classes. All participants possessed a minimum of one smartphone, providing the foundation for the study.

The experiment was implemented in the course "Intensive Reading". The course lasted 17 weeks and comprised 76 class hours. The course lengths are the same for both classes. The two classes were instructed by the same groups of teachers alternatively. The teachers instructed students three times/ twice once a week, with one class lasting two hours. The experimental group received training in reflective learning and was encouraged to adopt reflective English reading learning supported by mobile technology. Teachers also modified the teaching procedures and plans in accordance with the proposed reflective learning model. The control group also received training for mobile English reading learning and was encouraged to adopt a reading learning model supported by mobile technology.

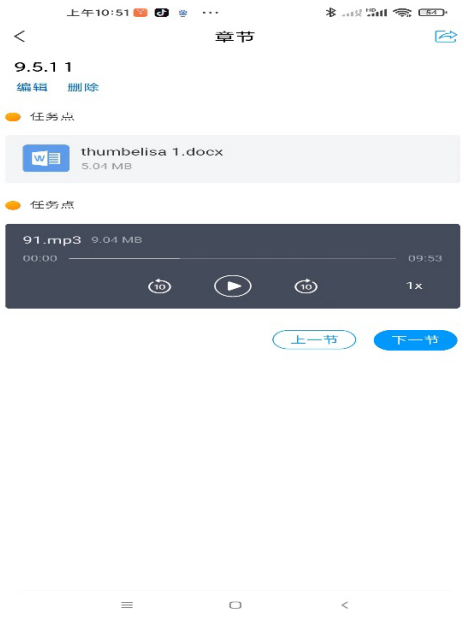
“Intensive Reading” is one of the core courses for students majoring in English. The course mainly aims to cultivate the basic language skills of first-year and second-year students, such as reading, writing and oral skills. The course also provides students with the opportunity to broaden their horizons about diverse cultures and motivate them to think about society and themselves. In this course, we aimed to improve students’ language skills and proficiency, cultivate a good learning habit, and foster students’ critical thinking skills. The reading program is expected to lay a solid foundation for students’ language skills and future study in other courses.

### 5.3.2 Resources

The learning resources for both classes are the same. Students were provided with reading materials in the textbook and in the online learning platform.

The reading materials in the textbook comprise two text stories in each unit. The textbook we adopted is Book 1 of *Contemporary College English* (the third edition), which is one of the most popular textbooks for students in English majors in China. The two stories within a single unit are typically associated with a common topic or theme. The lengths of the stories range from 800 to 2000 words. The first story (Text A) is covered in class, while the second story (Text B) is utilized as supplementary reading materials.

The reading material on the learning platform comprises eight articles. The material selection was inspired by the research findings of the previous study. In Study 1, students indicated a preference for audio and video reading materials, along with engaging stories of diverse genres. In Study 2, students highlighted challenges in discovering suitable articles to read and recommended that teachers offer additional reading sources. Hence, in Study 3, we selected articles relevant to the topics covered in the textbook and uploaded them onto the learning platform (Figure 5-3). For instance, the additional reading materials and textual narratives in Unit 1 focus on the school experiences of young students, while the passages in Unit 3 all centre around a suspenseful theme. Videos are also included in the supplementary reading materials to offer additional cultural or textual information. Additionally, all supplementary materials are accompanied by audio recordings to assist students in enhancing their listening skills. Besides, all online materials are enhanced with key word explanations to support students' reading process, and comprehension questions are included to evaluate their understanding (Figure 5-4). Ultimately, the size and format of the reading document were adapted to align with students' reading habits on their smartphones (Figure 5-5).



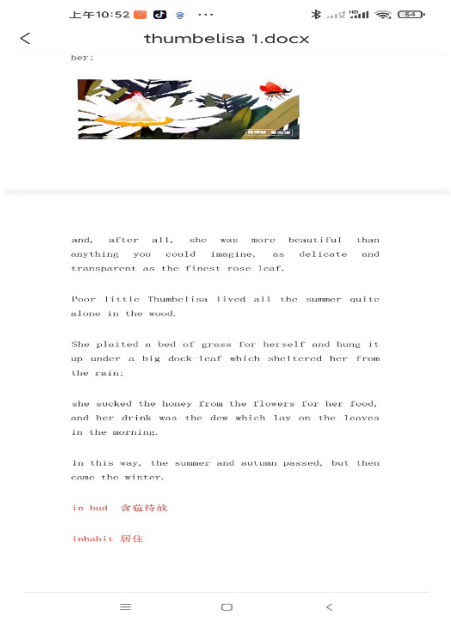




**Figure 5-3. Online reading materials (1)** **Figure 5-4. Online reading materials (2)**


**Figure 5-5.** Online reading materials (3)

Two smart applications were utilized to enhance students' learning in this program: the Chaoxing learning platform and WeChat. The online learning platform Chaoxing was required for all participants as they were supposed to complete the online reading passages and upload their reading assignments. Chaoxing (Figure 5-6), an online learning platform developed for teachers and students, provides a good channel for students' autonomous study and assists students' learning outside the class. It also

serves as a channel for teachers to gather feedback from students and monitor their learning progress. WeChat (Figure 5-7) is a widely used social media platform in China. We established a WeChat group for each class to facilitate communication. On this platform, we will post notice, remind students of assignments, offer answers to exercises/exams, address students' doubts and questions, and collect feedback.

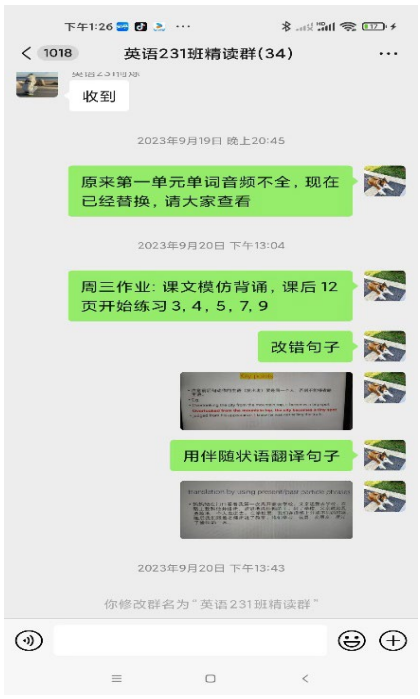




**Figure 5-6. Chaoxing online Platform** **Figure 5-7. WeChat interface**

### 5.3.3 Reflective activities adopted in the program

The program incorporated various reflective activities, including reflective journals, posttest reflective exercises, reflective writing, reflective questions, reflective discussions, and peer feedback.

Reflective journals, as an important educational instrument, can foster students' critical thinking, metacognition, and self-efficacy, as well as self-awareness in the pursuit of knowledge (Sudirman et al., 2021). Additionally, both self-exploration and problem-solving skills contribute to self-directed learning. In this study, reflective journals are employed to document students' learning processes and collect their feedback on the teaching process as well. Some guided questions are suggested to assist students in their reflection, but they are also encouraged to compose their own reflections. The guided questions encompass students' perceptions of the course in this unit, positive and negative aspects identified, challenges and accomplishments encountered, and their plans for the study in the upcoming unit. However, the format of the journal is not uniform. For the reflection journal on online self-learning, additional questions related

to students' attitudes toward this learning mode and the adopted learning activities were introduced. In the journal covering the entire term's study, students are encouraged to document their learning achievements in detail and articulate their thoughts on activities they wish to either maintain or eliminate in the next term. Additionally, they are expected to formulate plans for future studies and provide suggestions for teaching instructions. A total of five reflection journals were collected.

Posttest reflection exercises, also known as "exam wrappers," are reflective activities that students engage in upon receiving the results of their previous tests. Such exercises can be implemented in various classrooms to assist students in assessing their mastery of the course content and refining their test preparation methods. (Thompson, 2012). The reflection exercises implemented in the program are crafted based on Thompson's posttest reflection exercise(see Appendix VI ). They prompt students to reflect on their performance both before and after reviewing their graded test. The first four questions are about students' preparation and prediction for the exam. Students are expected to record the time invested in test preparation, specify time allocation, predict their test scores, and self-evaluate their preparation. The subsequent question, considered the most crucial, prompts students to categorize their mistakes. The final two questions involve students' preparation plans for the upcoming exam and the support they expect from teachers. The teachers collected and duplicated the wrappers, and then distributed them back to the students, prompting them to reflect on what modifications or alternative learning strategies they planned to incorporate before the upcoming test. To minimize the burden on students, the reflection journal and reflection exercises were frequently printed on a single sheet and distributed simultaneously, allowing students to complete both tasks concurrently. A total of four reflection exercises were gathered.

Reflective writing serves as an interactive approach for students to explore deeper into a problem, ask questions, and offer personal reflections on their learning experiences through journal writing on specific topics(Hussein. et.al, 2020). It provides students the opportunity to freely and creatively express their feelings about what they have learned. In this study, students in the experimental group are encouraged to engage in reflective writing tasks after completing the reading passages in specific units. While we suggest students focus their reflections on extracurricular reading, it is also acceptable for them to reflect on the texts covered in the class. To ensure students understand what they should contemplate in their writing, we provide reflection samples and offer guidance to students before the commencement of the program. The sample comprises three main sections. The first part offers a concise summary of the passages students read. The second part delves into the theme of the passage or what the writer aims to convey. The third part focuses on the students' reflections on their personal experiences. For instance, what are their perceptions about the topic? Do they agree or disagree with the author? Have they had similar experiences or encounters? What have they learned from the passage? Sometimes, a fourth section can be included for comparing passages covered in class and outside of class, but it is not mandatory. There are no word limits for these

writings, and there is no requirement for language fluency, as we prioritize students' reflection and thinking. A total of eight reflective writing tasks were collected.

Reflective questions are activities conducted to assist students in enhancing their understanding of the passages they read before the start of the new lesson. Reflective questions are usually assigned to students before the start of a new unit through the WeChat group or the online learning platform. Reflective questions aim to assess students' preliminary understanding of the text plot and their initial grasp of what the writer intends to convey. Given the word limits for the responses, students are encouraged to write down their answers to foster their summarizing skills. The teacher will evaluate students' understanding of these questions either at the beginning of the class (for questions related to the plot or basic understanding of themes) or during the instructional session (for questions delving into more detailed understanding). At times, reflective questions are also provided for videos posted on the learning platform.

**Reflective question sample（unit 1, ten words）**

*Upon first encountering the title of the story, what are your initial thoughts about its potential content?*
*Where are they going? How was the boy's feeling about the place?*
*Why did father send him there?*
*What was his feeling when he first came there?*
*Later how did his feelings change ?*
*What happened when he came out of it?*
*What might be the meaning of the text?*

Reflective discussions are activities conducted in class that involve the group exchange of ideas. These discussions aim to boost class participation, deepen understanding of the text, and foster critical thinking skills. The topics for reflective discussions involve several parts. The first category includes some detailed understanding of the text content that students might overlook during their reading process. The second category explores the understanding of the themes of the articles. The third category involves their reflection on how the theme relates to their lives and society.

**Topic sample for reflective discussion (unit 3 )**

*1. Why did all their children leave the land?*
*2. Do you think the couple know each other and love each other?*
*3. Do you think they will change their way of life one day?*
*4. What's your understanding of the secret message of the land after completing the text in class? Has your understanding changed compared to before?*
*5. Can you say a little about what the text wanted to tell us?*
*Urbanization and resistance?*
*Industrialization and the death of traditional handicrafts?*

*Development and the loss of tradition?*
*6. Are there similar situations in China?? Do you think it is the right choice for young people to leave the villages for cities? How can we preserve our traditions?*

Peer feedback involves the reflective process of peer assessment and evaluation. it has been reported to encourage reflection, as well as foster deep thinking and learning (Xie et al., 2008). Peer feedback was implemented in the program to promote student participation, fostering reflective learning from peers, and alleviating the teaching workload. Students were instructed to participate in peer evaluations of each other's reflective writing once. They provided feedback on the writing and then assigned grades based on the detailed evaluation criteria. Recognizing the possibility that students may be unwilling to assign low grades due to politeness, all grading work is conducted anonymously.

**evaluation criteria:**
*The scoring ranges from 70 to 90, with a 5-point interval, and provide comments if possible.*
*The reflections were written using their own expressions, ensuring that even readers unfamiliar with the original text could grasp the essence of the story.*
*Interpretation of the author's intent and personal reflection are included.*
*The language is roughly fluent.*

### 5.3.4 Procedure

The experiment began in September 2023 and lasted about 14 weeks. The determination of the time duration was guided by the academic calendar and the findings from another review by the researcher (not yet published). The course spanned approximately 14 weeks (from the 4th week to the 18th week, with the 6th week designated as a national holiday). Another consideration is that, through the review of reflection application in language classrooms, the researcher found that a longer duration generally tends to be more effective for reflection.

The experiment was divided into three stages. In the fourth week, the students as well as the teachers were informed about this experiment's purpose and procedure. They received coaching on the concept of reflection and guidance on how to engage in reflective practices regarding their studies. Samples of reflective journals and reflective writing were provided to students to facilitate reflection and learning. In addition, They were instructed to download the online learning platforms and join the WeChat group established for the course. Furthermore, a pre-test (Appendix VII) was administered to assess the reading proficiency of all participants. Additionally, a pre-questionnaire (Appendix V) was conducted among all participants to examine their perceptions regarding their level of self-regulated learning and critical thinking. Regarding teachers, they all received brief coaching to ensure they were informed about the purpose of the

experiment, understood the procedures, and were acquainted with the reflective activities to be conducted in class or to be encouraged for students to engage in after the class.

From the 5th week to the 17th week, we began promoting the implementation of the reading learning model in students' learning processes. In the experimental group, the promotion of the reflective learning model supported by mobile technology will be emphasized, while in the control group, emphasis will be placed on encouraging the mobile reading learning model. Typically, it takes about 8 to 10 hours to complete the study of one unit, so one round of reflective activities will be conducted over around two weeks. The detailed learning procedure is outlined in Table 5-1 and Table 5-2.

**Table 5-1. Learning procedures of the experimental group**

| stages | Activities | Behaviours |
|---|---|---|
| Reflection-for-reflection (before the class) | Reflective questions | Teachers assign reflective questions to students through the WeChat group before the commencement of a new unit to enhance students' understanding of the text during their initial reading and subsequently trigger reflections on the topic. |
| Reflection-in-reflection (in the class) | assessing students' reflection | Teachers assess students' comprehension and reflections on those questions either at the start of the class or during the middle of the teaching instruction.<br>The assessment can take the form of oral questions or multiple-choice questions to evaluate understanding. |
| | Reflective discussion | Teachers group students and motivate them to uncover detailed and hidden information in the text through guided questions.<br>Subsequently, teachers guide students to delve deeper into the theme of the text.<br>Following that, teachers encourage students to reflect more profoundly on the issue by connecting it to their personal preferences or experiences. Teachers may also prompt students to compare their reflections before the class with their current reflections. |

**Table 1. Learning procedures of the experimental group(continued)**

| | | |
|---|---|---|
| | | Upon finishing the learning for a specific unit, students will complete a reflective journal to reflect on their learning process, accomplishments, challenges, and devise plans for the next unit. |
| Reflection-on-reflection (after the class) | post Reflective exercises | Shortly after students receive the graded test and become aware of their scores, they will engage in the post-reflection exercises. This reflection will focus on the test preparation process, areas where they struggled, and their plans for improving their performance in the next quiz. |
| | Extracurricular reading | Students are encouraged to engage in supplementary reading materials in the textbook or on the learning platform accompanied by audio recordings.<br>They are also expected to respond to guided questions related to the reading materials. |
| | Reflective writing tasks | For each unit, students are encouraged to undertake reflective writings concerning their reading materials both in and outside the class. Students are expected to connect what they learned in the text to their real-life experiences and form their own opinions about certain topics or phenomena. |
| | Peer feedback | For the final reflective writing, students were directed to assess and grade their peers' writing. Each student anonymously grades one piece of writing to alleviate the burden on students. |

**Table 5-2. Learning procedures of the control group**

| Stages | Activities | Behaviours |
|---|---|---|
| before the class | Review the text story | Teachers assign reading comprehension tasks in the textbook to students to help them understand the general idea of the text |
| in the class | Assess students' understanding of the text | Teachers orally assess students' answers to those questions. |
| | Text Discussion | Teachers group students and motivate them to uncover detailed and hidden information in the text through guided questions.<br>Subsequently, teachers guide students to delve deeper into the theme of the text.<br>Furthermore, Teachers guide students to express their opinions about the theme. |
| after the class | Extracurricular reading | Students are encouraged to engage in supplementary reading materials in the textbook or on the learning platform accompanied by audio recordings. They are also expected to respond to guided questions related to the reading materials. |
| | Summative Writing | Students are expected to summarize the content they read and delve into the themes of the articles in a specific unit. |

In the 18th week, we concluded the experiment by conducting data collection. Firstly, a reflection journal about students' learning perception of the whole term is collected. Secondly, We conducted a posttest to assess whether the reading proficiency of participants improved and whether the experimental group outperformed the control group in their language learning gains. Thirdly, students filled out a post-questionnaire to evaluate their improvement in self-regulated learning and critical thinking skills. Fourthly, a semi-structured interview was conducted among students selected from the experimental group to explore students' perceptions of the learning model, the challenges they encountered, and their suggestions. Finally, a semi-structured interview was also conducted with three teachers to investigate their understanding of students' reflection, the challenges for teachers, and suggestions for the learning model.

### 5.3.5 Data collection

Data from the pre-test and the post-test, the pre-questionnaire and post-questionnaire, the semi-structured interview, the reflective journals, post-reflection exercises, and the reflective writing tasks were collected in this experiment.

The pre-test and post-test were all composed of three passages taken from College English Test 4 (College English Test or CET is a national English test in China that examines the English proficiency of undergraduate and postgraduate students in China. It includes two levels: CET4 and CET6). Passages in the two tests were different, but participants finished the same passages in each test. The tests consisted of three kinds of reading passages. The first passage was a standard reading comprehension passage with five multiple-choice questions, designed to test their understanding of details. The second passage is an adapted reading comprehension passage with two multiple-choice questions and three open-ended questions designed to assess students' ability to locate and generalize information. The third passage, designed to see their textual and vocabulary understanding, required participants to fill in 10 blanks to complete the passage by choosing from 15 given choices. The total scores for both tests were 20 for 20 questions.

The questionnaires(Appendix IV) utilized in the experiment were designed based on the Motivated Strategies for Learning Questionnaire. (MSLQ) (Pintrich, Smith, Garcia, & McKeachie, 1991), critical thinking scale(Stupple et al., 2017), and reflective thinking scale (Kember et al, 2000). The prequestionnaire is a 40-item instrument consisting of 4 subscales. The post-questionnaire is a 46-item instrument comprising 5 subscales. It is identical to the pre-questionnaire, except for the inclusion of an additional 6th subscale at the end. The first subscale (five questions) focuses on participants' demographic data, including class, age, gender, mobile devices used, and frequency of mobile learning. The second subscale (three questions ) centres on students' perception of the role of mobile learning as well as reflection. The third subscale (twelve questions) delves into participants' perception of their self-regulation

levels. The fourth subscale (eight questions) examined the reading strategies students employed in the learning process. The fifth subscale (eleven questions) evaluates students' perception of their critical thinking skills. Among all questions in this scale, three questions (29 to 31) are reversed. The sixth subscale in the post-questionnaire explores students' perception of their language achievement after the experiment and their willingness for future use. Except for the initial five questions, all other items are rated on a five-point Likert scale, where 1 means "strongly disagree" and 5 means "strongly agree."

The reflective journal, post-reflection exercises, and reflective writing(Appendix V) were also collected as data on students' self-regulated learning and critical thinking skills. These activities were generally completed and data were collected after the study of a specific unit. However, to prevent boredom caused by frequent reflection, we didn't collect these data in some units. The reflective journal and post-reflection exercises are usually completed on paper, whereas the reflective writing is done in various modes. Drawing upon the insights garnered from Study 2 regarding students' preferences for specific reflection modes, we present a selection of popular options for students to consider. These options include traditional paper reflection, audio reflection, and digital reflection. This diverse array of modes allows students the flexibility to choose the method that aligns best with their preferences and learning styles.

The semi-structured interview was conducted among students and teachers(Appendix IV). 18 students were chosen based on their grades in the pretest and posttest. The selection process was carried out in two phases. In the initial phase, we based our selection on students' overall test scores. Specifically, we identified two or three students from three categories, including those with high scores, intermediate scores, and low scores, respectively. In the subsequent stage, our selection criteria shifted to focus on students' progress between the two tests. During this phase, we chose two or three students from each of the three mentioned categories, namely those with substantial improvement, those with intermediate improvement, and those with little or no improvement. Six interview questions (IQ) formed the foundation of the interview with students. Regarding the teachers' interviews, all three participating educators in the experiment were interviewed to gather their insights on the learning model and to seek their suggestions. The interview with teachers was structured around a set of eight interview questions (IQ), forming the core framework for the discussion. Following the experiment, all interviews were conducted in Chinese. Teachers recorded their responses, which were later transcribed and translated into English for analysis.

### 5.3.6 Data coding and analysis

Data analysis adopted a mixed method of quantitative and qualitative research.

The first source of data was the test scores, which were analyzed qualitatively and quantitatively. For qualitative data, a descriptive analysis of score comparison for each class was made between the pretest and posttest including the average score, the highest and the lowest score, and the score range. For the quantitative analysis, an independent sample t-test was utilized to assess whether significant differences existed between pretest scores between the two group. Next, an analysis of covariance (ANCOVA) was performed to determine if a statistically significant difference in post-test scores existed between the experimental group and the control group.

The second source of data was the data from the questionnaire, which was analyzed quantitatively. The internal consistency and reliability of the questionnaire were tested by Cronbach's alpha coefficient. Subsequently, a factor analysis was executed to assess the questionnaire's validity, as well as to extract factors for subsequent analysis. Then based on the result of the factor analysis, we group the questions into four subscales. To explore students' perceptions of the self-regulation and critical thinking scales, the mean scores for these two scales were computed and compared. A paired-sample t-test was employed to evaluate whether there were significant differences in the two subscales between the pretest and posttest questionnaires within a specific group. In addition, an analysis of covariance (ANCOVA) was performed to determine if a statistically significant difference in post-questionnaire scores existed between the experimental group and the control group.

The third data source consisted of interview transcripts, journal entries, and post-reflection exercises, which were qualitatively analyzed using NVIVO software. All interview transcripts and journals were input into the NVIVO software and manually coded for analysis. The coding process included identifying words and phrases from the interviews and journals that corresponded to the previously mentioned guide questions. The primary themes were essentially derived from the guide questions. Then the researcher examined the transcription and journals carefully to locate codes through repeated ideas related to the guide questions. Subsequently, open codes of similar nature were clustered together to create categories. Following that, each category was labelled using terms and phrases pertinent to the guide questions. Furthermore, the titled categories were grouped together to address one of the guide questions. Ultimately, the categorization of one or more main themes may empower researchers to proficiently address and answer a research question.

The fourth data source consists of students' reflective writing for each unit. These reflections were analyzed to comprehend the students' reflective thinking levels. The coding of these reflective writings involved the application of the four-category scheme established by Kember et al. (2008).

The four designated categories encompass non-reflection, understanding, reflection, and critical reflection. The following are the detailed criteria adapted from Kember et al. (2008)

**Non-reflection**

- Students search for information on a topic and incorporate it into their writing without making a sincere effort to comprehend the underlying concepts or develop a thoughtful personal perspective.
- Predominantly consisting of reproducing the work of others, with or without adaptations.

**Understanding**

- The student adopts a deep approach to learning while seeking the author's underlying meaning
- The understanding relies on what they learned in the class.
- The concepts are perceived as theoretical, lacking a connection to real-life experiences or practical applications.

**Reflection**

- students apply the theory to practice and interpret concepts about personal experiences
- students' insights extend beyond theoretical knowledge found in books

**Critical reflection**

- Indications of a shift in students' perspective regarding a foundational belief in the comprehension of a key concept or phenomenon.
- Critical reflection is unlikely to occur frequently

## 5.4 Results of the experiment

### 5.4.1 The test results

An independent samples t-test was performed on the pretest data to determine if there were significant differences between the two groups in terms of reading proficiency prior to the intervention. The results are presented in Table 5-3. As indicated, the mean score of the experimental group is slightly higher than that of the control group, but there is no significant difference between the scores of the two groups(p= .061>0.05).

**Table 5-3. Results of the Pre-test between Experimental and Control Groups**

| Group | N | M | SD | Effect Size (Cohen's d) | df | Sig |
|---|---|---|---|---|---|---|
| Experimental | 29 | 9.86 | 2.574 | 0.509 | 1.914 | .061 |
| Control | 27 | 8.41 | 3.104 | | | |

Note: the mean difference is significant at the .05 level.

Subsequently, an analysis of covariance (ANCOVA) was performed to investigate the disparity in posttest scores between the experimental and control groups, revealing a statistically significant difference (p = 0.000). The Levene test for homogeneity yielded insignificant results (p = 0.299). Table 5-4 and Table 5-5 show the results of the analysis.

**Table 5-4. Means scores of the posttest between groups**

| Group | N | M | SD | Std. Error of Mean |
|---|---|---|---|---|
| Experimental | 29 | 14.07 | 3.011 | 0.559 |
| Control 27 | 27 | 9.893 | .806 | 0.773 |

**Table 5-5. ANCOVA: comparison of the posttest scores between groups**

| Source | Sum of squares | df | Mean square | F | Sig. |
|---|---|---|---|---|---|
| Pre | 10.143 | 1 | 10.143 | 0.867 | 0.356 |
| Group | 205.141 | 1 | 205.141 | 17.525 | .000 |
| Error | 620.386 | 53 | 11.705 | | |
| Total | 9011.000 | 56 | | | |

Note: the mean difference is significant at the .05 level.

### 5.4.2 The questionnaire Results

**(1) The validity and reliability of the questionnaire**

After collecting and screening the data for anomalies and outliers, factor analysis was conducted to assess the validity of the questionnaire items. Subsequently, reliability checks were performed using Cronbach's Alpha to measure internal consistency.

The Kaiser-Meyer-Olkin Measure, with a value of .662, indicated that the sample size was adequate for conducting a factor analysis. Furthermore, Bartlett’ s Chi-Square test (p = .001) was significant, confirming the appropriateness of the data for factor extraction. Subsequently, a principal component analysis was conducted and factor loading values of .50 and above were used as the cutoff criteria, leading to the removal of four items (11, 12, 23, 24) from the analysis. The result revealed that the extracted factors roughly aligned with four distinct categories, thereby providing support for the proposed four subscales and confirming the questionnaire's validity(see Table 5-6).

The obtained $\alpha$ coefficients of reliability for the four subscales ranged from 0.64 to 0.942, with the $\alpha$ coefficient of reliability for all subscale items being 0.945, demonstrating that the constructed questionnaire is a reliable instrument(see Table 5-

7). In the critical thinking subscale, one item (31) was excluded from the analysis due to its contribution to the lower alpha value.

**Table 5-6. Item loading for the four subscales**

| Items | Metacognitive self-regulation | Critical thinking | Learning strategies | Perception |
|---|---|---|---|---|
| 14 | .790 | | | |
| 10 | .722 | | | |
| 16 | .711 | | | |
| 13 | .706 | | | |
| 22 | .691 | | | |
| 21 | .665 | | | |
| 15 | .642 | | | |
| 19 | .627 | .535 | | |
| 17 | .603 | | | |
| 20 | .601 | | | |
| 18 | .597 | | | |
| 25 | .595 | | | |
| 9 | .524 | | | |
| 36 | | .811 | | |
| 35 | | .810 | | |
| 33 | | .736 | | |
| 32 | | -.694 | | |
| 34 | | .693 | | |
| 30 | | -.692 | | |
| 37 | | .642 | | |
| 38 | | .617 | | |
| 27 | | | .735 | |
| 28 | | | .709 | |
| 39 | | | .704 | |
| 29 | | | .685 | |
| 40 | | | .624 | |
| 26 | | | .608 | |
| 7 | | | | .803 |
| 6 | | | | .729 |
| 8 | | | | .698 |

**Table 5-7. α coefficients of the subscales**

| Subscales | Number of items | Cronbach's alpha |
|---|---|---|
| Perception | 3 | 0.816 |
| Metacognitive Self-regulation | 6 | 0.906 |
| Critical thinking | 8 | 0.640 |
| Learning strategies | 13 | 0.942 |
| All subscales | 30 | 0.945 |

(2) The comparison between the prequestionnaire and the postquestionnaire

The mean scores of each subscale were computed and compared both within and between groups to assess students' progress. Table 5-8 shows the mean scores and SD for each subscale.

**Table 5-8. The mean scores of each subscale**

| Scale | Variables | Group | N | Mean | SD |
|---|---|---|---|---|---|
| Metacognitive self-regulation | Pre-questionnaire | Experimental | 29 | 3.94 | 0.59 |
| | | Control | 27 | 3.62 | 0.62 |
| | Post-questionnaire | experimental | 29 | 4.3 | 0.55 |
| | | control | 27 | 4.1 | 0.56 |
| Critical thinking | Pre-questionnaire | experimental | 29 | 3.28 | 0.51 |
| | | control | 27 | 3.1 | 0.52 |
| | Post-questionnaire | experimental | 29 | 3.50 | 0.39 |
| | | control | 27 | 3.39 | 0.42 |
| Learning strategies | Pre-questionnaire | experimental | 29 | 3.94 | 0.61 |
| | | control | 27 | 3.62 | 0.61 |
| | Post-questionnaire | experimental | 29 | 4.22 | 0.66 |
| | | control | 27 | 4.17 | 0.57 |
| Perception | Pre-questionnaire | experimental | 29 | 4.33 | 0.56 |
| | | control | 27 | 4.27 | 0.62 |
| | Post-questionnaire | experimental | 29 | 4.61 | 0.49 |
| | | control | 27 | 4.51 | 0.47 |

Paired-sample t-tests were conducted within two groups to evaluate students' progress across the four scales. In the experimental group, significant differences were observed in the scales of metacognitive self-regulation(p=0.027) and critical thinking(p=0.04). Similarly, in the control group, significant differences were noted in the scales of metacognitive self-regulation(p=0.01), critical thinking(p=0.017), and learning strategies(p=0.02).

Then An ANCOVA analysis of covariance was conducted to examine the difference in post-questionnaire mean scores between the experimental group and the control group. Table 5-9 indicates that the p-values for the four subscales were all above .05, suggesting insignificant differences in all four scales between the pre-questionnaire and post-questionnaire results.

**Table 5-9. ANCOVA: comparison of post-questionnaire subscale mean scores**

| Scales | Source | Sum of squares | df | Mean square | F | Sig. |
|---|---|---|---|---|---|---|
| Perception | Pre | .014 | 1 | .014 | 0.062 | .805 |
| | Group | .143 | 1 | .143 | 0.640 | .427 |
| | Error | 11.862 | 53 | .224 | | |
| | Total | 1176.222 | 56 | | | |
| Metacognitive self-regulation | pre | .312 | 1 | .312 | 1.023 | .316 |
| | Group | .359 | 1 | .359 | 1.175 | .283 |
| | Error | 16.191 | 53 | .305 | | |
| | Total | 1006.485 | 56 | | | |
| Critical thinking | pre | .388 | 1 | .388 | 2.485 | .121 |
| | Group | .088 | 1 | .088 | .564 | .456 |
| | Error | 8.274 | 53 | .156 | | |
| | Total | 675.719 | 56 | | | |
| Learning strategies | pre | .559 | 1 | .559 | 1.469 | .231 |
| | Group | 3.663E-5 | 1 | 3.663E-5 | .000 | .992 |
| | Error | 20.169 | 53 | .381 | | |
| | Total | 1005.528 | 56 | | | |

Note: the mean difference is significant at the .05 level.

(3) Students' perception of language proficiency improvement and willingness to future use

In the final six questions of the post-questionnaire, we also explored students' perceptions of improvement in language proficiency and their willingness to utilize the learning model in the future. Table 5-10 shows that the mean scores for all questions

ranged from 4.19 to 4.59. Furthermore, the experimental group scored higher in all questions compared to the control group, but no significant differences were observed between the two groups($p > .05$)

**Table 5-10. Mean scores of the sixth subscale**

| Items | Group | N | Mean | SD | Std. Error of Mean |
|---|---|---|---|---|---|
| 41 | experimental | 29 | 4.45 | 0.572 | 0.106 |
| | control | 27 | 4.30 | 0.590 | 0.079 |
| 42 | experimental | 29 | 4.41 | 0.609 | 0.117 |
| | control | 27 | 4.30 | 0.465 | 0.090 |
| 43 | experimental | 29 | 4.34 | 0.670 | 0.124 |
| | control | 27 | 4.19 | 0.622 | 0.120 |
| 44 | experimental | 29 | 4.34 | 0.670 | 0.124 |
| | control | 27 | 4.30 | 0.609 | 0.117 |
| 45 | experimental | 29 | 4.31 | 0.604 | 0.112 |
| | control | 27 | 4.26 | 0.656 | 0.126 |
| 46 | experimental | 29 | 4.59 | 0.568 | 0.105 |
| | control | 27 | 4.48 | 0.509 | 0.098 |

### 5.4.3 Students' interview results

During the interview, 18 students were asked to express their perspectives on the proposed learning model concerning their language skills, learning habits, and thinking skills. Seven themes were identified concerning students' perception. Table 5-11 shows the results of the interview analysis, including themes, categories and the number of times mentioned.

**Table 5-11. Coding of the interview results**

| Theme | category | The number of times mentioned |
|---|---|---|
| Impacts on students' reading proficiency | enhance understanding | 8 |
| | Improve reading speeds | 7 |
| | enhance their reading skills | 6 |
| | Facilitates knowledge accumulation | 1 |
| Impacts on students' other language skills | writing | 9 |
| | listening | 7 |
| | vocabulary | 5 |
| | grammar | 4 |
| | speaking | 2 |
| | Translation | 1 |
| | Broaden the horizon | 1 |
| Impacts on their learning process and habits | Improve the learning process | 18 |
| | Change their learning habits | 12 |
| Impacts on their thinking skills | Critical thinking | 1 |
| | Deeper thinking | 15 |
| | Think from different perspectives | 3 |
| Problems encountered | Problems | 44 |
| | Difficulties VS. gains | 18 |
| | Study load | 23 |
| Willingness for future use | General approval | 13 |
| | Specific area of application | 8 |
| Reflective activities | Preferred activities | 29 |
| | Disliked activities | 2 |
| suggestions | collaboration | 2 |
| | Dealing with superficial reflection | 1 |
| | Diverse reading materials | 1 |
| | More summary | 1 |
| | More grammatical knowledge | 1 |
| | others | 1 |

(1) Impacts of the proposed reading learning mode on students' language skills

We investigated the model's effects on students' learning from two perspectives: its impact on reading and its impact on other language skills.

Regarding the impacts on their reading proficiency, all interviewed participants unanimously agreed that the learning model helped enhance their reading comprehension. Four categories were identified among all the reasons students provided: (A) enhance understanding; (B) improve their reading speed; (C) enhance their reading skills; and (D) facilitate knowledge accumulation.

The most frequently reported benefit is the enhancement of passage, sentence or word understanding.

*S4: Then through reflective reading learning, I feel that I can better grasp the gist of the article.*

*S16: The understanding of a single sentence. In the past, I had to read a long article to understand it in general, but now I can understand this sentence as I finish reading it. I don't have to read all the passages.*

Another benefit frequently mentioned by students is the improvement in their reading speed. They attribute this improvement to increased reading via mobile phones or paper books.

*S9: For reading speed, if you read a lot, you will know more words, and the reading speed will be a little faster, and then the efficiency will be improved.*

*S18: Reading speed. Maybe because I read more both via mobile phones and on paper books, my reading speed improved.*

Several students also mentioned that their reading skills, such as summarization abilities, improved as a result of reflective learning. Additionally, one student mentioned that she accumulated more knowledge during the learning process.

*S15; I developed better reading habits and then learned to summarize in reading.*

*S1: Then in the process, I can learn more reading skills, which is more conducive to my later English learning.*

*S1: Then it will accumulate some very useful knowledge.*

Regarding the benefits related to other language skills, areas of improvement reported by students were categorized into seven distinct groups: (A)writing; (B)listening; (C)vocabulary; (D)grammar; (E)speaking; (F)translation; (G) broadening horizons. Among all these categories, writing, listening, vocabulary, and grammar are most frequently reported as benefits associated with this learning model.

*S4: I think it will be more helpful to write articles. I usually summarize the articles like this, and then I may write more in English, and learn more English expressions.*

*S18: Listening. While I read the articles posted, I also listened to the recordings attached and felt it helped improve my listening.*

*S3: After reflection, you may accumulate some new words and phrases.*

*S7: I feel that I understand grammar knowledge better and can use it correctly in actual situations.*

(2) Impacts of the proposed learning model on students' learning process and learning habits

Concerning the learning process, some students reported that this proposed learning model helped them read more materials via smartphones and allowed them to utilize fragmented time to read diverse materials, which is quite convenient and beneficial.

*S16: Because in addition to books, we usually have more contact with electronic devices, so they can help us read more materials.*

*S18: It can change the way we used to read on paper. For Reading via the phone, we use all kinds of fragmented time and needn't hold a book in our hands anytime and anywhere, It is very convenient.*

Others reported that this model deepened their memory and helped them uncover their problems and progress in the learning process.

*S8: If you reflect on what you have done before, you may have a deeper understanding and remember it vividly.*

*S7: it helps me to review my reading at this stage to a certain extent, and then summarize it, and find out in which areas I have made my progress, or in which areas I still have shortcomings that still need to be made up for at the end of this stage of my reading.*

In terms of the impact of the proposed learning model on one's learning habits, nearly all students reported that it did alter their learning routines, though not all students

provided reasons; some simply expressed an intention to change their learning habits. Some students indicated that they had already utilized reflective learning or turned it into a voluntary activity. However, one student, while expressing approval, also indicated that such a model needs time to cultivate good learning habits.

*S2: I think so. Because it will make me reflect on it, and then I will turn this reflection into a habit of mine, which may not only be a follow-up in terms of learning, but also change my learning habits, because I may just do it Not only at times when I am asked to reflect, but also at times when I may not be asked to reflect.*

*S7: Yes, it will. I feel that this learning method is more effective than routine memorization. It is faster, more memorable and more interesting.*

*S18: Yes, it will be. but it takes time.*

(3) Impacts of the proposed reading learning model on students' thinking skills

Regarding thinking skills, almost all students expressed agreement with the positive impact of this learning model on their cognitive abilities. Students identify four main positive effects: (A) engaging in deeper thinking in passage understanding; (B) fostering profound thinking about the learning process; (C) encouraging thinking from different perspectives; and (D) engaging in critical thinking.

*S7: it is beneficial to you to question yourself and the knowledge you learned*

*S12: you can look at the problem from different aspects and think about it from multiple perspectives.*

*S15: I will think more deeply about this question, why is this happening, and then what will happen?*

*S6: every time I will reflect on which side and what aspects I have shortcomings and so on. I will strengthen these points in the process of learning, and then let me think more about what shortcomings I have and how to do it better next time.*

(4) Problems encountered

Concerning the encountered problems or challenges, students reported various problems, and their responses were categorized into three distinct groups: (A) language problems; (B) reflection problems; and (C) habit problems.

Within the realm of language issues, vocabulary challenges, sentence problems, and translation problems were most frequently reported.

*S1: Maybe sometimes the vocabulary is not enough, especially some slightly advanced vocabulary, but I don't know the root of the word, and then it's easy to make mistakes.*

*S3: On the other hand, there may be a misunderstanding of grammar. The tense and inversion of sentences may both lead to my misunderstanding of the sentences and then choosing the wrong answer.*

*S4: in the summary of the text, I may think in Chinese, and the summary may be very good. But I don't know how to say it in English. Or I can't express the same meaning in English as I do in Chinese.*

Concerning reflection issues, students mentioned problems such as insufficient depth of reflection, lack of organization and reflection skills, and uncertainty about what to reflect upon.

*S15: Maybe sometimes the reflection is not deep enough, and what I think might be too superficial and simple.*

*S12: One thing is that it can't be well organized. It's possible that everything is not considered thoroughly.*

*S1: sometimes it may not be easy to sum up my learning process or achievement, maybe the corresponding ability needs to be improved.*

*S16: Sometimes if you do this kind of reflection, you feel that you have too many problems, but you don't know how to solve them in a targeted manner. although I know I have a problem.*

Regarding challenges in altering their learning habits, students mentioned issues such as laziness and difficulty in adhering to their resolutions.

*S14: I know what my shortcomings are, But maybe I will be a little lazy in the process of improvement. I know it, but I'm too lazy to do it.*

*S18: I think the biggest difficulty is that it is a little difficult for me to make changes subjectively. Yes, as I just said, I have to take my time in changing my learning habits. Every time I make up my mind to correct it, but the reality is that it is very difficult to put my resolution into action.*

In addition to addressing concerns, the interview also explored whether students perceive reflective activities as an additional burden on their studies. All students expressed that engaging in reflective activities did not impose an extra workload on them. Furthermore, they emphasized that the learning benefits gained from these activities outweighed any challenges they encountered.

(5) Wiliness for future use of the proposed model

In terms of the willingness for future use, almost all students expressed their intent to continue using the learning model in the future. Some students conveyed general

approval, while others specified certain fields or subjects for the potential application of this model.

*S14: That depends. I will consider my situation and maybe I will adopt it to improve myself.*

*S18: Yes, I'm already trying. For example, I'm already reflecting on the listening exam. I've already reflected on it.*

(6) Preferences for reflective activities

About the reflective activities implemented in the experiment, two categories were identified among students' responses: (a) preferred activities; and (b) disliked activities.

In terms of the preferred activities, the most frequently reported activities were reflective discussion and post-reflection exercises, followed by reflective questions, reflective writing, and reflective journals.

*S18: The one I completed on paper--reflective exercises, because I may not feel too bad before the exam. But when I got the score, I saw that the score was a little lower, and then there would be a gap between the expectation and the real achievement. At this time, reflection would motivate me to work harder.*

*S2: The reason why I like course reflection and discussion is that I can communicate with classmates or teachers intuitively, and then I will not postpone the problem until it is necessary to solve it, and I can get some feedback in time.*

*S11: I prefer reflective questions before class so that I can review the reading I have mastered. Then you can understand this article more deeply.*

*S10: I feel this kind of reflection(journal) is helping me review. It will make me think about my shortcomings, and then I will focus more on such part in the study next week.*

*S15: I prefer reflective writing.*

In terms of disliked activities, peer feedback and reflective questions were mentioned.

*S16: But for peer evaluation, I always feel that I have no comments on other’s writing/journal or on my own.*

*S15: As for reflective questions in class. I think this time for them is relatively short, and then I don't like it very much.*

(7) Suggestions for the proposed model

Regarding suggestions for this learning model, the majority of students expressed satisfaction and did not provide any suggestions. Only seven suggestions were collected from six students. Their suggestions covered areas such as collaboration, diversity of reading materials, more grammar and summary, etc.

*S14: For better reflection, we can communicate with each other and discuss our own problems. Or we can look at other people's problems, see if they happen to you, and then correct them, etc.*

*S16: I think we can collect some of the problems that we encountered in reading articles posted on the learning platforms in the publication for an overall solution.*

*S12: I think every reflective reading may have different contents. then it will be more enjoyable.*

*S10: More grammar knowledge and more summary.*

### 5.4.4 Results of students' reflective journals and post reflection exercises

Since on many occasions, the two materials were distributed and collected together, they were coded and analyzed together. There are altogether 127 entries collected. Six themes were identified among students' entries. Table 5-12 displays the detailed themes, categories, and the respective numbers within each category.

**Table 5-12. Coding of the reflective journals and exercises**

| themes | categories | Number of Entries |
|---|---|---|
| Recording learning gains | Language improvement | 99 |
| | Improvement of the learning process | 8 |
| | Improvement in self-regulated learning | 10 |
| | Improvement in thinking level | 7 |
| | motivation | 8 |
| | Self-efficacy | 2 |
| Discovery of problems | Language problems | 92 |
| | Problems in the learning process | 21 |
| Record learning process | | 28 |
| Make plans for future learning | Plan for the study of future units | 82 |
| | Plan for future exams | 93 |
| Teacher-student communication | Perception of the class | 74 |
| | General suggestions | 5 |
| | Specific suggestions | 119 |

(1) Recording Learning gains

In terms of learning gains, students predominantly perceived improvements in their language skills, including enhanced reading comprehension, expanded vocabulary, and increased grammatical knowledge.

*J102: My vocabulary has expanded and I have a better grasp of grammar knowledge*
*J107: I made progress in reading. I learned some reading skills and learned not to spend too much time on one word or one sentence*
*J127: I can read more clearly and I have learned lots of new words*

Regarding process improvement, students reported benefits such as effective adaptation and the development of good learning habits.

*J11: At first, I was at a loss, but fortunately, I quickly adjusted my mentality and study adapted.*
*J14: I did a good job of preparing and memorizing the words before class so that I could listen to the new content easily.*
*J25: I have learned to organize knowledge points and review them on time.*

Concerning the cultivation of self-regulated learning, students reported that they are acquiring skills in making plans and learning autonomously.

*J2: I learned independently and freely, and made a daily study plan.*
*J43: review according to plan. Review every week and consolidate what I learned every month.*
*J64: I know what I should make up for and improve, and further strengthen my applying ability.*
*J23: I tried to make a schedule and managed to finish it.*
*J6: Learn to self-regulate my study.*
*J53: More organized in learning.*

In terms of their thinking skills, we can see from the entries that some students reported they engaged in deep and autonomous thinking. Also, they could relate what they learned to the society and their life.

*J7: learned to think deeper when reading.*
*J54: More Autonomous thinking.*
*J11: I not only gained knowledge but deeply understood the change in the world.*

*J30: I have learned that modern society is developing rapidly. We need to abandon the old traditions and keep the excellent traditions.*
*J71: Meanwhile, I think a lot about values. I gained knowledge and understand some ideas about life.*

Motivation and self-efficacy are two areas not explicitly addressed in the guide questions, yet some students mentioned that they felt motivated and experienced increased self-confidence during the learning process.

*J23: Everyone takes it seriously and that motivated me.*
*J28: I am motivated in the study.*
*J113: This semester there were many small activities, I think the class interest and enthusiasm were improved.*
*J38: I feel confident in the class after I am familiar with the class pattern.*
*J71: more confidence in English learning.*

(2) Identifying learning problems

The most frequently reported problems by students were related to language, with grammar issues, vocabulary challenges, and difficulties in understanding ranking at the top.

*J32: Understanding and translation of single sentences are not so good.*
*J104: My vocabulary is still limited. And I often forget the meaning of words that I encountered in the reading materials*
*J121: I make less progress in the deeper analysis of the text as well as the practical application of grammar.*

Regarding challenges in the learning process, students reported issues such as time management, distractions, excessive homework, feedback concerns, and difficulty in identifying key knowledge.

*J16: Attention is easy to be inattentive.*
*J34: Too much homework.*
*J50: I don't have enough time to preview, because I don't plan time well.*
*J99: I can't find the key knowledge points in the text.*
*J96: the difficulties and problems can't get feedback on time.*

(3) Recording their learning process

In their journals, some students made detailed and specific recordings of what they had learned during the process.

*J124: I have completed the articles in the textbook, some movies about history and an English novel.*

*J120: The old yeller, All the texts in the textbook, listening articles and movies.*

*J114: Eight English articles in the textbook, two videos and many audio videos.*

However, most students gave a quiet general account of their learning process.

*J126: Completed reading articles, and listen to the audios.*

*J49: I learned a lot about words and texts.*

*J63: I have learned a lot of knowledge points, including words and phrases.*

(4) Making learning plans

Most students reported their plans for future study and exam preparation in the journals and reflection exercises, constituting a significant portion of the entries. In categorizing their plans, we classified them into two types: (A) general plans and (B) specific plans. Regarding quiz plans, 25 entries were categorized as general plans, while 68 entries were identified as specific plans. Regarding the plans for future study, 48 entries were categorized as general plans, while 34 entries were identified as specific plans.

*J21: Remember words, learn grammar knowledge and expand extracurricular knowledge(General).*

*J56: Strengthen the basic knowledge(General).*

*J14: Be familiar with sentence structure to do better in translation; Take class notes carefully; Do the exercises carefully (specific).*

*J15: Promote sentence understanding to translate them more fluently; Counsel teachers about grammar problems; Analyze the differences between words(specific).*

(5) Teacher-student communication

Communication between teachers and students also forms a significant portion of the content in students' journals and reflection exercises. Three categories were identified among all the responses: (A) perception of the class; (B) general suggestions; and（C） specific suggestions. Students provided 74 entries on their perceptions of the class and offered 119 detailed suggestions and 5 general suggestions for future classroom instruction.

*J33: I feel more and more comfortable with the teacher's teaching style (A).*

*J23: It is a little difficult to learn(A).*

*J113: I hope teachers pay more attention to ability practice (B).*

*J16: impress me deeper in certain ways (B).*

*J126: I look forward to learning more grammar and reading skills in the next term (C).*

*J103: I hope the teacher can add more fun to the class. I tend to feel sleepy in the morning (C).*

### 5.4.5 Students' reflective writing

Students' writing samples were collected from both the initial and final writings respectively. The reflective levels were compared to ascertain whether there was a change over time. The reflective writings were assessed by two raters, one of whom is the researcher, and the other is another instructor of the course. Any discrepancies in their ratings were resolved through discussion. The intraclass correlation coefficient (ICC) was used to investigate the inter-rater reliability of the two ratings. The ICC is 0.950 for the initial writing and 0.886 for the final writing, indicating a high level of inter-rater reliability between the two raters in both writings. Table 5-13 presents the results of rating results of students' reflective writings.

**Table 5-13. The reflection level between the first writing and the last writing**

| Reflection level | The first writing | percentage | The last writing | percentage |
|---|---|---|---|---|
| None-reflection | 12 | 48% | 4 | 16% |
| Understanding | 6 | 24% | 9 | 36% |
| Reflection | 6 | 24% | 11 | 44% |
| Critical reflection | 1 | 4% | 1 | 4% |

Below are excerpts from students' reflective writings, categorized by their respective ratings:

*From this story, I know everyone has untapped powers within him or her. We must try our best to learn how to use them better in order to make us more excellent(RW1:non-reflection).*

*This article mainly tells me that I have to work hard to get a scholarship(RW1:non-reflection).*

*The author wants to express the friendship between humans and animals, the loyalty and reliability of animals, and we should care for animals and protect nature. I like the first story, the moving friendship between the boy and Maheegun(RW8:understanding).*

*I think white lies are sometimes necessary, provided that the purpose of the lie must be for the good of the person.But lies will bring harm to people as the saying goes, when a person tells a lie, he often has to use more lies to round up the lie. So I think we should like as little as possible and treat others with sincerity(RW8:reflection).*

*Overall, I thought the story was resonant and I like it. I like the ending because it is the turning point of the article. I share the feeling with the writer as there are many secrets between friends, which is very valuable, we should treasure our friends. I also liked the language in it, brief and clear language.But one aspect,I think it can be strengthed is that we can add more descriptions between Pierre and Joseph(RW8:critical reflection).*

### 5.4.6 The teachers' interview results

During the interview, three teachers were asked to share their perspectives on the proposed learning model regarding their understanding of reflection, the effects and challenges they encountered during implementation, as well as their suggestions for future programs. Six themes were identified concerning the teachers' perceptions: (1) the impact of reflective learning on students' reading learning; (2) the benefits of students' journals to teachers; (3) elements frequently reported and problems discovered in students' journals; (4) teachers' reflection; (5) problems encountered in the implementation of the learning model; and (6) suggestions for improvement.

(1) The impact of reflective learning on students' reading learning
Regarding the teachers' perception of reflection in students' learning process, all three express positive attitudes. They noted that reflective learning could aid students in recording learning processes and uncovering their own learning gains and problems.

*T2: I think we can help students understand the effect of their learning, through reflective journals or exercises they are supposed to complete in the early stage to record their entire early learning process. At the same time, they can also find out some shortcomings and defects in the previous study process and then pave the way for the planning for the learning stage.*

*T3: Reflection is undeniably essential, whether it's for a teacher or a student. In the process of students' learning, there are numerous aspects they may find challenging to summarize. Therefore, it's crucial to reflect on their difficulties and recognize aspects they may not have realized on their own.*

(2) Benefits of students' reflection to teachers

The first benefit they mentioned is a good channel of teacher-student communication. Two teachers value reflection as "*a very valuable opportunity for our teachers to communicate with students(T1)*" or *"better understand some of the hidden ideas of these students(T2)"*. It provides a convenient channel for teachers to understand what students are thinking about the teachers, the course and themselves. This kind of communication is beneficial to build mutual trust and understanding.

The second benefit is the discovery of problems in the course design and

implementation. Through the analysis of students' journals and interviews, teachers identify areas for improvement in course design such as excessive homework, inadequate development of reflective skills, and insufficient output in reflection. Consequently, adjustments will be implemented in the current or future programs to address these issues. For instance, upon recognizing students' shallow reflection in their journal entries and reflective writing, teachers expanded the range of reflective questions in the journals and provided detailed guidance on how to write reflectively. As a result, students' reflections became noticeably more profound

*T2: The problems students encounter may reflect certain deficiencies or issues in the teaching process. Therefore, through students' reflective journals, teachers may also identify some of their own shortcomings. These issues may encompass student needs, prompting us to adjust the content and pace of our teaching accordingly, including adapting certain teaching methods, among other adjustments. In addition, teachers can better understand some of the hidden ideas of these students.*

The third benefit teachers mentioned is the adjustment of teaching methods or contents in accordance with students' needs. Based on students' feedback about needs and problems in the teaching process, teachers may adjust their teaching skills and content accordingly.

*T1： For example, I found that many students mentioned this problem of teaching in English at the very beginning. they said that there was too much English in the classroom, and it would be difficult for them to understand. So we need to make appropriate adjustments.*

However, teachers also indicated that they would maintain their steadfastness and make slight modifications, as students' ideas may sometimes be one-sided.

*T1: We can make some targeted changes to some of the demands of students. We need an appropriate adjustment, but not all of them can be adjusted, not necessarily. I think sometimes the students' words are one-sided.*

(3) Elements and problems observed in students' reflection

Regarding elements frequently mentioned in students' reflections, teachers noted that students often reported issues related to their weak language foundation, as well as challenges in their learning such as translation or understanding sentences.

*T2: From the earlier interviews and feedback in journals, I discovered they reported many problems concerning their language foundation. Their basic knowledge is still relatively weak, including vocabulary, grammar, and the understanding of the text.*

*T1: I also found students reported many problems problems when I browsed the students' reflection journals. For example, sometimes students found it difficult to understand the long sentences of the article. sometimes they reported that the grammar was difficult so they couldn't understand the sentence structure and couldn't translate them well. Those elements were often mentioned.*

Regarding the problems observed from students' reflections, The main issues teachers reported involve students' improper language usage and deficiency in reflection skills, leading to shallow and unfocused reflections.

*T2: I believe this type of activity is novel in its form, and students show interest in it. However, considering their language proficiency and the depth of their thinking, I find their output in reflection to be somewhat unsatisfactory. For instance, the choice of words, sentence structure, and grammar they employed were not very standardized. In terms of content, at times, their reflections appeared quite superficial, lacking in-depth analysis of their problems. Additionally, some students seemed uncertain about what to say or write, resulting in empty journal entries.*

Another concern pertains to the quantity of reflective output. Teachers observed that students' output fluctuates depending on the given requirements, and sometimes the anonymity of the reflection process also influences the extent of student output.

*T1: Another problem I found was that I printed out two activities, unit reflection and test reflection, on a piece of paper and distributed them to students in the beginning. Then I found out that many students didn't write any specific reflections, which is probably because there were names on the paper of test reflections*

*T1: At times, students may write a substantial amount of content, while at other times, they may produce less. Moreover, some students' reflections appear to be merely a formality, with their writing being overly general, often comprising just a single sentence.*

T1 also mentioned issues of reflection modes as well as difficulties in conducting reflection effectively.

*T1: In addition, I think most of the Reflection is done on paper. In fact, the advantages of mobile technology are not so much revealed. I encouraged students to do audio reflection since they can exercise reflective skills as well as listening and speaking skills. However not many students did audio reflection. I think this is also a pity. For them, they are more dependent on traditional methods and may be more accustomed to writing on paper.*

(4) Teachers' reflective habits

When asked about how teachers conducted reflections on their teaching process, most teachers reported that they consistently reflect on their teaching through interviews, class observation, training or academic research. They also mentioned reflection is not necessarily in formal ways such as through journals. Instead, they often engage in reflection during fragmented periods.

*T2: One is through interviews with students, including seminars, to understand their voices and ideas. Another way is through learning from teachers in other colleges and universities. Another method is that sometimes we will attend some training or seminars and hear the experiences of some famous professors and we may gain some inspiration and suggestions. In addition, it is also a kind of reflection to write some papers on teaching and research or teaching reform or to participate in some teaching and research projects. Sometimes when I lie in bed and can't sleep, Maybe I will also think about some specific parts of my class today.*

*T1: I will observe the students' performance, and I will go down to communicate with them after every class. I'll inquire about their opinions. After class, I will read some reflections written by students. Firstly I will check what they want to learn from the class. Then I will try to find out what they report about their problems and make some adjustments. I think when students express their demands in the reflection, we have to make responses or feedback, even if I can't change as they wish. Communication like this will be a more positive one.*

*T3: Reflection is a regular practice for me as a teacher. Since I started teaching at our school, my methods have been continuously evolving and improving.*

(5) Problems encountered in the implementation of the learning model

One crucial challenge teachers face is the amount of workload in implementing the program.

*T1: Another aspect to consider is the substantial workload and demands placed on teachers. Teachers are tasked with planning and assigning various tasks, organizing students' feedback and journals, and grading students' reflective writing, all of which constitute a significant workload. Communication and task allocation within the group is also crucial. The workload associated with these tasks is substantial and necessitates effective division of labour and coordination among teachers.*

Another problem is the need for students' cooperation and motivation in the learning program, otherwise those activities can't be carried out.

*T2: One crucial aspect is the need for students' cooperation during the program. Otherwise, there is a risk that despite investing significant time in preparing these*

*activities, we may not receive any feedback or achieve desired outcomes without student cooperation.*

*T1: I think it is a big challenge how to get them interested and motivate them to learn via reflection.*

Another issue is the effectiveness of students' reflections. Some of their reflections lack effectiveness due to insufficient reflection skills.

*T3: Now the key is that the student should know that he needs to reflect, but he doesn't know how to reflect. It appears that effort has been exerted, yet no significant progress has been achieved.*

(6) Suggestions for improvement

Regarding teachers' suggestions for future improvement, they suggested improving the design of the activities, such as diverse journal forms and guide questions, more specific guidance, etc.

*T2: from the teacher's point of view, I think we can refine the reflective journals/exercises, give more detailed instructions, and then make the guided questions in the journals/exercises more diverse. And we have to constantly adjust according to the feedback from students. Maybe we will discover some parts of these activities don't go as smoothly as we plan and expect, and then we need to modify them based on the practical situations. Otherwise, students may feel bored or meaningless to conduct these activities.*

*T1: About our Journal, we need to diversify it. We can give students more specific and clear guidance because students are indeed not very good at doing this kind of reflection.*

Another suggestion offered by teachers is to encourage more group collaboration among students and more communication between students and teachers by reversing the roles.

*T2: I think young people have a lot of ideas, and group collaboration such as debate can bring in much exchange of ideas and thinking, which is also very helpful for their reflection.*

*T1: I agree. Some students also proposed similar suggestions—group discussion or consultation to understand the meaning of the passages. He used the method when he couldn't figure out the meaning of an article. Therefore I think we can also organize this kind of student group communication.*

*T2: The regular conversation between students and teachers is usually performed by journals or exercises assigned by teachers. then why not let students take the initiative in the process? For example, the students check teachers' reflections and see what teachers reflect about students.*

Teachers also proposed some encouragement measures to motivate students' learning such as awards, or lectures by successful businessmen.

*T1: in addition, I think we can appropriately implement more encouragement measures. As long as students have the internal motivation for learning, they can persist. otherwise, if there is no external pressure or internal motivation for any activity, students are very unlikely to insist on doing it. So in my opinion, we need to spur on students pressure in the earlier stage and then motivate them in the latter stage. Motivation can be realized through activities. For example, we encourage students to conduct a reflective cooperative activity such as group discussion and group exchange of ideas and then award those who perform well in the activities. Also, we can select and post some good work of students online for others to comment and learn. Those who are chosen will also be awarded in one way or another. I think we can design different kinds of wards for student activities to stimulate their motivation.*

*T2: Then we can also invite some companies from the society to enter our classroom. Let the students know what kind of talents are needed in the society. In this way, They may have a clear idea of why they are learning and what they should learn, thus developing learning incentives and motivation.*

## 5.5 Discussion

### 5.5.1 Impact on students' language proficiency

(1) Improvement of students' language proficiency

In the pretest, the mean score of the experimental group (9.86) is slightly higher than that of the control group (8.41), but there is no statistically significant difference between the scores of the two groups ($p = .061 > 0.05$). This suggests that there is no significant disparity in reading proficiency between the control group and the experimental group.

In the post-test, the mean scores of the two groups are 14.07 and 9.89, respectively. The improvement of the experimental group (4.21) is greater than that of the control group (1.48). The result of the analysis of covariance (ANCOVA) indicates a statistically significant difference ($p = .000$) in the post-test scores between the two groups. This suggests a significant disparity in reading proficiency after the intervention between the two groups.

Based on the analysis of the test data, it is evident that the proposed learning model is effective in promoting students' reading proficiency.

(2) Positive perception of language gains
Both the questionnaire and interview data indicated that students in the experimental group perceived improvement in language proficiency.

In the questionnaire data of the experimental group, all students agreed or strongly agreed that this learning model has enhanced their language skills. The mean perception scores in the experimental group are generally higher than those in the control group(from 0.05 to 0.15 points).

During the interviews, all participating students reported that the proposed learning model significantly enhanced their reading proficiency. The areas of improvement mentioned included enhanced understanding, increased reading speed and skills, and facilitated knowledge accumulation. In addition to improvements in reading, enhancements in writing and listening skills were also frequently reported in the interview.

Based on the analysis of the questionnaire and interview data, we concluded that students generally consider the proposed learning model effective in promoting their various language skills.

To sum up, the analysis of the test scores demonstrated that the proposed learning model is effective in enhancing students' reading proficiency. Additionally, the analysis of the questionnaire, journal entries, and interview data indicated that students also perceive the proposed learning model as effective in improving their reading skills as well as other language skills. This finding, although uncommon due to its quantitative nature, aligns with the study of Chang and Lin (2014), in which they discovered that reflective e-journals promoted students' reading performance, writing and organizational skills.

### 5.5.2 Impact on students' self-regulated learning

(1) quantitative analysis of the questionnaire results
In terms of the enhancement of their self-regulated learning, a paired-sample t-test indicated significant differences within both groups before and after the experiment ($p = .027$, experimental group; $p = .001$, control group), with p-values less than the threshold of 0.05, suggesting a statistically significant improvement in metacognitive self-regulation skills in learning in both groups following the intervention. However, an ANCOVA analysis of the pre-questionnaire and post-questionnaire data did not reveal any significant differences($p = .283 > 0.05$) between the two groups after the intervention. This suggests there was no significant disparity in metacognitive self-regulation skills after the intervention between the two groups.

Multiple factors could contribute to the phenomenon. On one hand, both classes were assigned writing tasks. In the control group, students were tasked with summarizing extracurricular online reading materials or Text B from the textbook and thinking about the conveyed message. Conversely, the experimental group was instructed to engage in reflective writing. It's plausible that through the summary task, students also document their reading process and content, thereby potentially enhancing their self-directed learning. On the other hand, following the mid-term examination, students received their exam papers for review and explanation. In the experimental group, students proceeded with reflective exercises. In contrast, students in the control group were expected to self-evaluate their learning process and achievements. It's conceivable that students in the control group also reflected on their learning process independently through the examination papers.

(2) Qualitative analysis of the reflective journal, reflection exercises and interviews.
Subsequently, we analyzed the data obtained from the reflective journals, post reflection exercises, and student interviews to track students' progress in this regard.

From the reflective journals and reflection exercises, we observed numerous entries from students detailing their planning(175), recording (28), and uncovering problems and gains(247) in their learning process. 16 entries documented self-reported improvements in their self-regulated learning process. From these observations, we note that most students began to apply metacognitive self-regulated skills such as planning, recording, and self-assessment to their learning. Some students have already recognized the development of such skills in themselves and have taken steps to reinforce them in their studies.

From the interview data, it is evident that most interviewed students (15) reported that the proposed learning model has altered their learning habits. Among them, 10 interviewees mentioned that reflection helped them uncover both challenges and successes in their learning journey. Another interviewed student highlighted that reflective learning played a crucial role in organizing his knowledge. Additionally, two students noted that they had implemented reflective learning in other subjects, while another two students shared that reflective learning had evolved into a voluntary learning activity for them.

Based on the analysis of the journals, post reflection exercises, and interview data, it is evident that students' metacognitive self-regulated learning skills have been improved. They demonstrated the ability to autonomously plan their learning, identify both challenges and successes in their learning journey, and effectively organise their learning. Furthermore, they recognized the impact of the learning model on their learning habits and expressed a willingness to apply it to their future studies voluntarily.

The findings are consistent with previous research results regarding the relationship between reflection and self-regulated learning. Engaging in reflection aids the development of students' reflective skills and encourages them to take ownership of their learning(Ayan, 2010; Gün, 2011). An interactive and reflective learning model for English writing helped students raise awareness of learning process and led to self-directed learning (Murugaiah & Thang, 2010; Kizilcik & Daloglu, 2018). Reflective tasks such as journals, logs, portfolios, and reflection exercises have been identified as potentially beneficial for self-directed learning and as effective tools for reviewing and preparing for tests (Ahmed, 2020; Chang & Lin, 2014). They allow students to recognize their strengths and weaknesses, facilitating opportunities for improvement (Punyapratheep & Wudthayagorn, 2022). Moreover, they actively engage students in processes to plan, monitor, manage, and evaluate their learning independently (Lee & Cha, 2017; Kizilcik & Daloğlu, 2018). Additionally, these tasks have the potential to promote students' self-regulated skills, leading to enhanced performance in exams (Thompson, 2012).

### 5.5.3 Impact on students' critical thinking skills

(1) quantitative analysis of the questionnaire results

In terms of the enhancement of their critical thinking skills, a paired-sample t-test indicated significant differences within both groups before and after the experiment ($p = .04$, experimental group; $p = .017$, control group), with p-values less than the threshold of 0.05, suggesting a statistically significant improvement in critical thinking skills in both groups following the intervention. However, the ANCOVA analysis of the pre-questionnaire and post-questionnaire data yielded similar results to the analysis of self-regulated learning, showing no significant differences ($p = .456 > 0.05$) between the two groups after the intervention.

Several factors could contribute to the phenomenon. Firstly, in the summary task conducted by the control group, students were encouraged to explore underlying themes and express personal opinions based on their experiences. This approach might also contribute to the enhancement of students' critical thinking skills. Secondly, in the discussion session, students from both groups are encouraged to share their opinions about the topics of the articles, which also helps foster their critical thinking skills. Thirdly, students in both groups are motivated to respond to thought-provoking questions when they complete passages on the online learning platform, which could also deepen their understanding and further develop their thinking skills. Fourthly, the synthesized score representing metacognitive self-regulation skills/critical thinking skills doesn't offer insight into the specific areas where learners have enhanced their skills. Therefore, it is possible that some significant improvement in certain areas may be counterbalanced by some insignificant even negative improvement in other areas, leading to a generally insignificant improvement. Prior literature also suggests that when employing questionnaires or scales to quantitively assess students' self-regulation

or thinking skills, not all areas will exhibit significant improvement or exert influences upon academic achievements (Nguyen & Ikeda, 2015; Chang et al., 2018; Broadbent, 2017; Naber & Wyatt, 2014)

(2) Qualitative analysis of the reflective journals, reflective writings and interviews. Subsequently, the researcher turned to journals, reflective writing, and interview data to gather evidence of the improvement in thinking skills.

From the reflective journals, we identified 7 entries related to students' thinking skills. It is evident that in the learning process, some students engaged in deep thinking(4) and demonstrated deeper levels of introspection in life(3).

From the interview data, the majority of students (15) reported a noticeable shift in their thinking patterns following the experiment. We identified 19 entries related to students' thinking skills. During the interviews, students reported undergoing a transformation in their thinking abilities, including advancements in self-questioning(1), multi-perspective thinking(3) and deeper contemplation of both the passage(9) and the learning process(6).

Concerning the reflective writing, we analyzed them by the reflection level.

From Table 17, it can be observed for the first writing assignment, Nearly half of the writing assignments(48%) were rated as non-reflection because in those writings students either failed to clearly describe the event or story, did not address the topic, or simply copied sentences instead of expressing their understanding.

24% of the writings were rated as Understanding because students were able to clearly describe what happened and introduce the topic or theme relatively accurately, but they failed to relate their learning to their experiences. 24% of the writings were rated as Reflection because students were able to relate their personal experiences to the topic discussed. Only one writing was rated as Critical reflection as the student described a significant change in belief within the writing.

When it came to the last writing assignment, the proportion of writings rated as non-reflection decreased to 16% It was noticeable that students generally provided more detailed summaries of the event, and the reproduction of original work decreased significantly. Furthermore, the proportion of writings rated as understanding increased from 24% to 36% The ratio of writings rated as reflection surged dramatically from 24 % to 44%. From the writings, it is evident that students generally wrote longer and delved deeper into understanding the topic. They also demonstrated an ability to relate what they learned to their personal experiences. One writing was rated as Critical reflection since it presented critical ideas regarding the enhancement of the reading

topic.

Based on the comparison of the two writing tasks, it can be inferred that students exhibited a greater utilization of reflective thinking skills in the latter writing task.

To sum up, based on the analysis of reflective journals, reflective writings, and interview data, it is evident that a significant number of students demonstrated engagement in deeper analysis from multiple perspectives and exhibited reflective thinking skills. However, a minority of students displayed proficiency in critical thinking skills. The findings are largely consistent with prior research regarding the influence of reflection on the enhancement of learners' thinking skills. Bharuthram (2018) noted during his teaching of reflection, students recognized reflective tasks as prompting them to engage in deeper or critical thinking about various issues. Peñaflorida( 2002) held that reflective journal writing helps document students' self-reflection components that involve evaluating writing activities, demonstrating, and developing in-depth thoughts. Similarly, Beseghi (2021) and Dantas-Whitney (2002) observed that reflective activities, such as maintaining a diary or recording audio journals, serve as effective methods for fostering reflective and critical thinking among learners. Chang & Lin (2014) observed that reflective e-journals in learning assist students in organizing the main ideas of reading passages. Additionally, they found that this practice aids in comprehending articles more thoroughly, enabling clearer expression of thoughts in writing. This process also revealed some level of critical thinking skills and indicated the depth of reflection.

### 5.5.4 Suggestions for improvement of the reflective English learning model in implementation

Although both teachers and students expressed their support for the proposed model, they also highlighted challenges encountered during the implementation process. Hence, based on an examination of feedback from both students and teachers, alongside insights gleaned from previous literature on reflective learning, several suggestions are posited to enhance the implementation of the reflective reading learning model.

(1) Teachers may guide and support students to make good reflections.
One of the most significant challenges students faced was the deficiency in reflective skills, leading to superficial reflections. Hence, several measures can be implemented to address this issue.

Firstly, teachers can provide coaching/training with reflection samples or guidelines to enhance their reflective skills. It is imperative to ensure that students comprehend how to engage in reflective learning.

Second, detailed scaffolding and structure are necessary in the reflection process to help students understand what to write and how to write. Nevertheless, it is crucial to acknowledge that scaffolding should not remain static, as it may contribute to boredom and diminished reflection output, as observed in this study.

Thirdly, support during the reflective process should be provided such as teachers' prompt feedback on students' reflective efforts or their comprehension of the passages, as highlighted in this study.

(2) Teachers can endeavour to foster students' motivation for reflection

Motivation stands as a crucial element in students' reflective learning endeavours. Without motivation, students may perceive reflective activities merely as routine tasks to complete, resulting in superficial or ineffective reflection. Hence, it is essential to motivate students both at the outset and throughout the reflective learning process.

Initially, before commencing reflective activities, it is imperative to ensure that students grasp the meaning of reflection and comprehend the potential benefits it can offer in both their current studies and future endeavours. With these concepts in mind, students are more likely to be motivated to engage in reflection, thereby enhancing their learning outcomes.

Then, significant progress in students' learning can serve as a motivational force. Reflective activities such as post reflection exercises are greatly welcomed in the present study simply because they enable students to assess their strengths and weaknesses after the exams. This underscores the importance of reflective activities that facilitate students' recognition of their progress. Moreover, the anticipation of future benefits can also serve as a motivating factor. For instance, guest lectures by entrepreneurs may inspire students by offering insights into potential career paths and real-world applications of their reflective learning.

In addition, various motivational measures in the class can be implemented to motivate students. Firstly, a good reflective environment could be created to inspire greater reflection. For instance, one student in the present study mentioned feeling motivated during reflective discussions due to the active participation of all students in the activity. Secondly, implementing reward measures for exemplary reflections can be beneficial. This may include posting and sharing exceptional reflection samples with other students, as well as considering grade rewards in certain circumstances.

(3) Teachers may design reflective activities with a balanced approach that considers both diversity and workload.

One commonly reported issue with reflective learning is the boredom induced by repetitive reflection tasks. Therefore, in designing tasks, teachers should select suitable and proper amounts of reflective activities based on the objective of the learning program and the features of potential activities. In addition, a multitude of reflective tools can be introduced instead of focusing on one reflective approach. Such a customized and diverse reflection approach could promote learner motivation and persistence while at the same time diminishing boredom(Guo, 2022).

Time and workload are other essential issues instructors should take into consideration. Many previous studies have noted students' concerns about the time-consuming nature of completing reflections or the additional workload it entails (Absalom & De Saint L éger, 2011; Ahmed, 2020; Murugaiah & Thang, 2010; Villamizar & Mejía, 2019; Tahmasbi et al., 2022). However, in the present study, neither of these issues were reported. The researchers attribute this to two factors. The first factor is that the cycle of reflection aligns with the class schedule. Reflective activities are integrated into the arrangement of class activities. For instance, reflective questions are assigned alongside tasks for previewing before class. The second factor is the effective allocation of time. Activities were assigned to students at various intervals, allowing them ample time to complete them. For instance, students are given up to 10 days to complete reflective writing assignments. Post-reflection exercises and reflection journals are assigned to students immediately after receiving the exam paper for the corresponding learning unit. Therefore, the researchers believe that proper arrangement of reflective activities and timely reflection will alleviate the potential workload it may impose on students.

(4) Teachers may consider implementing collaborative activities both among themselves and among students.

Teachers face a great amount of workload in planning, implementing and assessing the reflective reading learning activities. Therefore, fostering group collaboration among teachers is necessary to pool ideas together and distribute the workload, thereby alleviating the burden on individual teachers. Moreover, collaboration among both teachers and students, including mechanisms such as peer and teacher feedback, can empower students to have a greater voice in the reflection process and facilitate learning from one another.

Collaboration among students is essential in that it can help learners perceive things from different perspectives and deepen their reflection based on others' shared experiences (McKenna et al., 2009). More importantly, it may help learners come up with solutions to problems that are not likely to be inspired by individual reflections (Prilla et al., 2020). Collaborative reflection, as supported and suggested by both teachers and students in the present study, can take on various forms, including group discussions, group summaries, shared answers and questions, group presentations, peer

feedback, etc. However, one important consideration is that teachers must ensure that all group members can actively participate in the collaboration and contribute to the group's achievements; otherwise, it might lead to ineffective collaboration. Additionally, teachers need to devise fair assessment methods to evaluate the contribution of each member, thus encouraging active participation from all individuals. Another crucial consideration for teachers is the importance of respecting students' privacy and cultural norms in interrelationships during the reflection process, as highlighted by Thang et al. (2010) and Lee & Mori (2021). Particularly in activities like peer feedback, teachers must address students' concerns regarding ego and privacy issues. It is essential to create a supportive environment where students feel safe and comfortable expressing their opinions truthfully. In such situations, it is advisable to encourage anonymity in the reflection process. This anonymity can also be extended to reflective journals for similar reasons.

(5) Teachers may enhance students' reflection output by emphasizing reflection content over language skills during instruction.

The language barrier is one serious problem that hinders students's reflection output. On one hand, students' language proficiency may not be sufficient for them to effectively express their thoughts. On the other hand, they may not be accustomed to or may simply lack the knowledge of how to write critically (Bharuthram, 2018). Therefore, teachers may initially focus on developing students' reflective and critical writing skills through skill training and sharing of templates. However, Students should be granted the freedom to write as they please, as fixed templates can sometimes be perceived as restricting the personal space in which they can openly reflect (Ahmed, 2020). Then in the reflection process, the reflection content should be prioritized and encouraged over the language output to motivate students's enthusiasm in participation. Encouraging frequent reflection output, implementing peer feedback, and sharing exemplary student reflection samples can assist students in consistently generating language output and learning from their peers to enhance expression, ultimately resulting in their improved language proficiency.

### 5.6 Conclusion

This study focuses on investigating the impact of a reflective reading learning model supported by mobile technology on learners' language proficiency, self-regulated learning and critical thinking skills. The proposed learning model, inspired by Cowan's reflective diagram, was devised and subsequently tested in a classroom experiment to assess its impact on students' learning outcomes. Quantitative findings from tests and questionnaires indicated that the proposed learning model significantly influenced students' reading proficiency while showing no significant impact on their self-regulation and critical thinking skills. Nevertheless, qualitative findings from reflective journals, exercises, written assignments, and interviews demonstrate that the proposed

learning model also contributed to the enhancement of students' metacognitive self-regulation, reflective thinking skills, and deep thinking abilities. Drawing upon the analysis of issues and suggestions identified in the experiment, several implications concerning the implementation of the reflective learning model were proposed, encompassing aspects such as program design, coaching, motivation, and collaboration.

The present study poses a few limitations. Firstly, insufficient motivational strategies were implemented to mitigate potential boredom in the learning process. Future studies may focus more on motivational strategies in the reflection implementation. Secondly, group reflection is implemented to a lesser extent compared to individual reflection in this study. Future studies may cast more attention to collaborative reflection activities in the language learning process, especially the off-class collaborative activities and strategies. Thirdly, there is a possibility that the activities designed for the control group and the experimental group may overlap in certain aspects. Also, no specific activities targeting critical thinking skills were designed to enhance this aspect of learning. Future studies may design specific activities targeting critical thinking or self-regulating skills. They may also emphasize the implementation of diverse reflective activities, especially technolgically scaffolded activities as well for better learning outcomes. Fourthly, the quantitative analysis method for evaluating self-regulated skills and critical thinking may not be sufficiently detailed to detect changes in specific areas. Future studies could explore more refined methods to capture nuanced improvements in these skills.

## 5.7 Summary of this chapter

In this chapter, a reflective reading learning model was proposed and tested to examine its effect on students' learning gains. The quantitative results indicated that the proposed model significantly influenced learners' reading proficiency, while the qualitative findings revealed that the proposed learning model indeed facilitated the promotion of metacognitive self-regulation, reflective thinking skills, and deep thinking abilities. Based on the analysis, the researcher also put forward implications for the implementation of the reflective learning model.

# Chapter 6 Conclusion

## 6.1 Summary and Novelty

In this section, we will first summarize the design and findings of the three studies. Following that, we will outline the novelty of the dissertation research.

Study 1(Chapter 4) focuses on investigating the perception of college students about an extensive reading program via smartphones. Reading exercises via smartphone applications were used as a complement to the intensive reading course and students are expected to engage in simple summaries about their reading materials upon completion. Instructors monitored the reading process by randomly selecting 10 students and reviewing their summaries, either orally or through written journals, during weekly class breaks. Its finding reveals that despite the deep penetration of smartphone use in daily life, those students don't form the habit of mobile reading. However, most students approved of this reading learning approach and agreed that it was effective in increasing their learning interest, promoting their autonomous learning ability, and enhancing their reading proficiency. Smartphone-assisted reading is accepted for its abundance of resources and convenience. Language learning applications and video resources are greatly favoured among students. But at the same time, many problems concerning this approach emerge in the study such as distraction, cost, motivation, evaluation, etc. The findings of Study 1 successfully achieved SRO1 by investigating students' mobile learning habits and their perception of learning through mobile reading. Furthermore, the students' overall positive attitudes toward mobile learning laid the groundwork for subsequent research based on mobile technology.

Study 2 (Chapter 5) integrated reflection into an extensive mobile reading program and investigated students' perceptions of reflection and this program as well as their preferences for reflection modes. In this study, students read passages on mobile applications and completed a reflection in one mode every two weeks. Four modes (paper journal reflection, e-journal reflection, audio reflection, and collaborative reflection) were adopted in the study. Pretest/posttest, questionnaires and interviews were used to collect data. Results showed students generally approved of the effect of this reflection-facilitated mobile-assisted reading program and their reading proficiency improved significantly after the program. In addition, most students favoured reflective practices as a good way to stimulate interest, deepen understanding and promote reflective and summarizing abilities, but they didn't consider it a good method to monitor the learning process in the mobile-assisted reading program. As for the preference for reflection mode, most students favoured traditional paper reflection and audio reflection, while collaborative reflection and e-journal reflection received the least support. The findings provided implications for educators and app designers. For educators, merely viewing reflection as a method for process management and

monitoring might create unease among students. Instead, it's advisable to help students understand that reflection serves multiple functions in their learning journey, including enhancing language skills, fostering student-teacher communication, and enabling self-assessment of their learning progress. Furthermore, instructors can create an optimal reflective environment after taking students' age, learning backgrounds, and preferences into consideration. For app developers, some preferable reflection modes facilitated with stimulative measures may be offered to cater to more learners to conduct reflective activities. The findings of Study 2 reached the SRO2 by effectively grasping learners' perception of reflection function and preferences for reflection modes. Furthermore, the insights gained about reflection functions and preferences not only partially serve as the rationale for creating a reflective learning model but also aid in formulating concrete implementation strategies.

Study 3 (Chapter 6), based on the findings in Study 1 and Study 2, designed a reflective learning model for reading supported by mobile technology and investigated its impact on learners' language proficiency, self-regulated learning and critical thinking skills. The proposed learning model, inspired by Cowan's reflective diagram, was devised and subsequently tested in a classroom experiment to assess its impact on students' learning outcomes. Reflection was seamlessly integrated into every stage of the reading learning process, employing a variety of reflective activities including reflective journals, reflective writing tasks, collaborative discussions, post-reflection exercises, and reflective questioning. Quantitative findings from tests and questionnaires indicated that the proposed learning model significantly influenced students' reading proficiency while showing no significant impact on their self-regulation and critical thinking skills. Nevertheless, qualitative findings from reflective journals, exercises, written assignments, and interviews demonstrate that the proposed learning model also contributed to the enhancement of students' metacognitive self-regulation and thinking skills. In terms of metacognitive self-regulation, students demonstrate the ability to autonomously plan their learning, identify both challenges and successes in their learning journey, and effectively organize their learning. Furthermore, they recognize the impact of the learning model on their learning habits and express a willingness to apply it to their future studies voluntarily. Regarding their thinking skills, although critical thinking skills were rarely identified, students demonstrated engagement in deeper analysis from multiple perspectives and exhibited reflective thinking skills. Drawing upon the analysis of issues and suggestions identified in Study 3, several implications concerning the implementation of the reflective learning model were proposed, including aspects such as program design, coaching, motivation, and collaboration. Firstly, teachers may guide and support students to make good reflections such as providing coaching/training with reflection samples or guidelines, offering detailed scaffolding and structure, and providing support during the reflective process. Secondly, teachers can endeavour to foster students' motivation for reflection in various ways. Thirdly, teachers may design diverse reflective activities with a balanced

approach that considers both diversity and workload. Fourthly, teachers may consider implementing collaborative activities both among themselves and among students. Fifthly, teachers may enhance students' reflection output by emphasizing reflection content over language skills during instruction. The finding of Study 3 fulfilled SRO3 by successfully designing a new learning model and then confirming its effectiveness in supporting students' learning from various aspects.

To sum up, the three sub-objectives were successfully achieved by the three studies, leading to the effective achievement of the main research objective.

The dissertation differs from previous literature in three aspects: the research content, the research method, and the the research focus.

Firstly, this research investigated the role of reflection in English reading learning and constructed a model to guide its implementation, addressing a critical gap in this area. As reflection is primarily regarded as a cognitive process, much of the existing literature on language learning has focused on its role in cultivating metacognitive skills in the language learning process. However, the aspects related to language growth especially in reading have been less thoroughly investigated. This present study seeks to explore the role of reflection more comprehensively, encompassing reading skills, self-regulated learning skills, and cognitive skills. Furthermore, previous studies typically concentrate on the effects of specific reflective activities on language learning, but they seldom construct a comprehensive learning model to guide students' reflection and learning throughout the entire learning process. However, the present study develops a new reflective learning model by incorporating various reflective activities throughout the entire learning process. Also, mobile technology is seamlessly integrated throughout the learning process to underscore reflective learning, contrasting with other studies that predominantly explore the supportive role of information technology, like online learning environments, which emphasize off-class learning activities. The new model, constructed based on well-known reflection models and reading theories, can guide both students in the reading learning process and teachers in planning and implementing reflective activities.

Secondly, a comprehensive mixed method of research was adopted in this research. Much of the existing literature on reflective language learning has adopted qualitative methods, focusing on analyzing either the impact of reflective activities, such as journaling, on learners, or the results of interviews/questionnaires. Some studies employed a mixed research method, incorporating quantitative analysis of language proficiency tests or questionnaires alongside qualitative analysis. However, to ensure the accuracy of the research results and offer educators more viable teaching strategies, the present study adopted a more comprehensive and innovative mixed research approach. For the qualitative research, we analyze not only students' perceptions

through interviews and journal data but also their language or cognitive skills through the output of their reflective writing. For the quantitative research, we not only analyze the impact of the proposed model on students' language proficiency but also their self-regulated and metacognitive skills quantitatively.

Thirdly, This research focuses on integrating reflection into both curricular and extracurricular activities to enhance reading learning. In previous research, many scholars have focused on the role of reflection as a means of promoting extracurricular language learning, rather than as an integral part of curriculum activities. However, in this study, reflection was integrated into the formal curriculum and was undertaken by students as both curriculum and extracurricular activities.

## 6.2 Research contribution

This research made contributions to academic fields, practical domains, and the field of knowledge science.

### 6.2.1 Academic contribution

In this research, we developed a reflective learning model for English reading and tested its effectiveness in promoting students' learning gains and learning process. This study is significant in two ways.

On the one hand, the proposed learning model enriched the existing literature on the theoretical framework of reflection and reading learning in language education, offering theoretical support for individuals as they conceptualize and develop specific reflective learning frameworks tailored to their classrooms.

On the other hand, this research on reflection design and its implementation will contribute significantly to the empirical study of practical applications of reflective practices. This will provide valuable guidance for researchers and practitioners who wish to engage in reflection research. In addition, it could also make a significant contribution to research in the field of language education and language psychology, particularly concerning reading learning strategies, self-regulated learning and cognitive skills in the information age.

### 6.2.2 Practical contribution

The study could also make significant contributions by providing practical guidance for practitioners in the field of language education.

Firstly, it will offer policymakers, education providers, and language instructors managerial and implementation implications regarding reflection. In the study, the theoretical model was designed to guide based on a thorough understanding of

reflection nature and its edge. This model was then put into action to explore its influence on language learning, resulting in valuable pedagogical insights being uncovered. Therefore, for college leaders and policymakers, the study presents the benefits, problems, and a framework for reflective reading learning in a mobile environment. This knowledge allows them to consider, at a higher level, whether and how to integrate reflection into their language classrooms（Chan, & Lee, 2021）. For language instructors interested in adopting reflection, this study may provide insights into how to initiate and implement reflection through detailed activities. Through the proper implementation of reflective activities, teachers can also gain a better understanding of the teaching and learning process, enabling them to make adjustments when necessary. This can enhance classroom teaching and help improve their own teaching skills.

The study will also provide language learners with practical implications as to how to conduct reflection in their learning process to promote their language skills, cognitive skills, or self-regulated learning. The study will promote students' understanding of the importance of reflection in the language learning journey and broaden their awareness of the various ways they can apply reflection to enhance their learning experience. The study can also guide students in selecting appropriate reflective activities tailored to their needs and effectively implementing them to enhance learning outcomes. It could also offer strategies as to how to manage and assess their learning through reflective practices. This can lead to a more efficient and impactful learning process and foster academic success.

### 6.2.3 Contribution to knowledge science

Knowledge science is an interdisciplinary area which focuses on exploring "Knowledge Creation and Transformation, Knowledge Representation, Systematization, Acquisition, Knowledge Management, Systems Science, Education and Knowledge Science, Technology innovation, etc" (Tian et al., 2007，380). Reflection involves the process of deeply and critically thinking about one's experiences or thoughts, to gain insight, acquire knowledge, and make improvements for future actions or decisions. It is acknowledged that reflection is a crucial approach to acquire knowledge. Therefore, this study of designing a reflective learning model will significantly contribute to the field of knowledge science.

Firstly, this research contributes to the process of knowledge creation. In this research, a new reflective learning model for reading via mobile technology was developed in college language education. In this process, new insights into theoretical learning models were generated, which could serve as a guide to enhance people's understanding of reflection. It could enhance people's understanding of how language knowledge can be acquired through reflecting on past learning experiences, both successes and

setbacks and incorporating them into their new experiences through the formal learning process among college students. Understanding how individuals integrate new information into their existing knowledge structures through reflection will be crucial for studying knowledge acquisition processes.

Secondly, it contributes to knowledge application and acquisition. The conceptualized model may be realized in diverse learning environments to guide learning and teaching. Meanwhile, The implementation of the model can further generate detailed knowledge about implementing reflection in the specific domain of learning. Such knowledge guides people in enhancing learners' competence through specific strategies, including tracking, monitoring, and planning learning, and sheds light on effective knowledge management and utilization strategies in diverse contexts. In addition, by reflecting on knowledge acquisition processes, individuals can identify gaps in understanding areas for improvement and strategies for more effective learning, leading to improvement in metacognitive skills and knowledge for better language acquisition. Understanding how one learns and finding effective methods to enhance learning are crucial for lifelong learning, informal learning encounters, and cognitive growth among learners.

### 6.3 Recommendations for future research

Based on the previously discussions in the three studies such as motivation issues, collaboration challenges, modes and activities of reflection, and sample size/diversity, future research may focus on the following areas to further understand the role of reflection in the language learning process.

Firstly, future studies may focus more on motivational strategies in the reflection implementation. Motivation is essential for students' engagement in any activity. In this dissertation research, several motivational strategies are implemented, such as pre-program training and grade awards. It turned out to be effective in promoting their engagement in reflection and language learning. However, we also notice a reduction in the reflection output in the latter stage, indicating a diminishing effect of the motivational strategies. Future studies should explore at which stages these strategies are most needed and how to implement them effectively. Additionally, they should investigate which types or modes of activities are more motivating compared to others. Furthermore, this research reported hindrances of students' habits upon learning such as laziness and a tendency to become distracted, even though they recognize the importance of reflection. So future studies may also investigate ways to help students overcome such hinderances and form good learning habits.

Secondly, future studies may cast more attention to collaborative reflection activities in the language learning process. In this research, the off-class collaborative activity in Study 1 didn't stimulate students' engagement and received poor feedback. The collaborative activities in Study 3 receive mixed results. The collaborative discussion in class was well received by students, but the peer feedback after class was poorly received. Therefore, future studies could further explore methods for designing/implementing off-class collaborative activities and strategies for effectively stimulating students' participation and performance through suitable activities. More studies could specifically investigate the influence of factors such as culture, privacy, and personal traits on students' reflective learning processes when peer feedback is involved.

Thirdly, future studies may emphasize the implementation of diverse reflective activities, especially technolgically scaffolded activities. Study 3 adopted multiple activities instead of single reflective journals, which altered students' negative perception of reflective practices as uninteresting and lacking diversity, as observed in the previous two studies. This demonstrated that incorporating multiple activities or reflective learning models throughout the process provides more benefits to motivation and the learning process compared to relying on a single activity.

Fourthly, future studies may focus more on the effect of reflection on English reading/writing proficiency. Currently, there is a scarcity of studies investigating the impact of reflection with mobile technology in this area, with even fewer studies utilizing an experimental group to evaluate reading proficiency. The present dissertation research validated students' positive perception of reflective learning with mobile technology and demonstrated the effectiveness of this learning model in enhancing reading proficiency. Future studies may explore the relationship between the development of reflection levels and students' language enhancement in greater depth. Also, given the limited sample size and relatively moderate duration, further research with a larger and more diverse sample size, as well as a longer or longitudinal duration, is needed to explore the effectiveness of reflective learning in promoting language learning through both qualitative and quantitative assessments.

List of publications and presentations

Journal Paper

[1] Wang, F., Yuizono, T., Wang, T. Y., Kim, E., & Lu, Y. Integrating Reflection into a Mobile-Assisted Reading Program for Learning English as A Second Language in China. In *Frontiers in Education* (Vol. 7, p. 1050). Frontiers. https://doi.org/10.3389/feduc.2022.1067523

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[1] Wang, F., & Yuizono, T. (2021, November). Developing EFL Learner's Reading Comprehension through a Smartphone-Assisted Reading Program. In *Proceedings of the 2021 5th International Conference on Education and E-Learning* (pp. 51-58).

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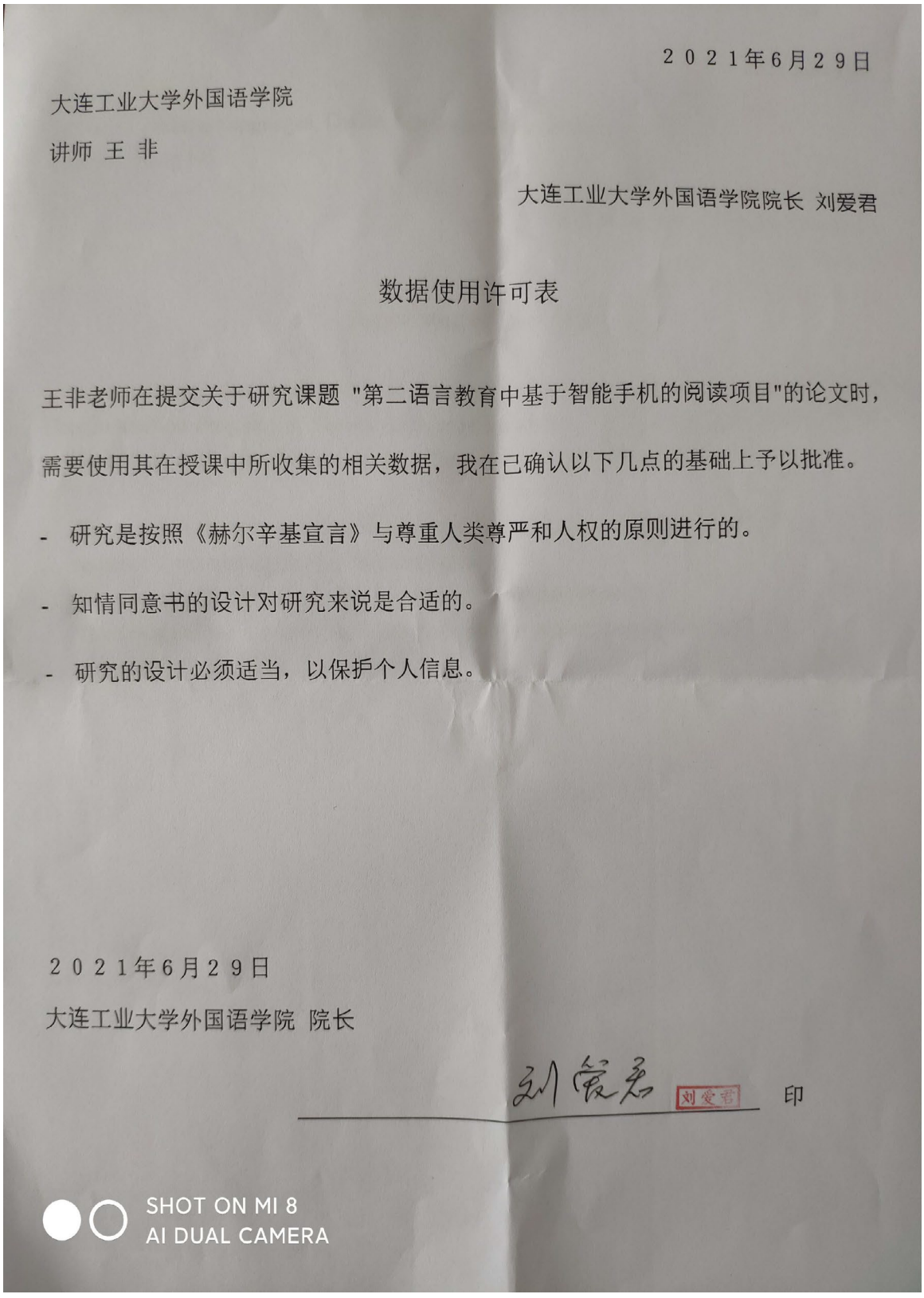
# Appendices

## Appendix I Consent forms for Study 1, 2 and 3

Study 1



2021年6月29日

大连工业大学外国语学院

讲师 王 非

大连工业大学外国语学院院长 刘爱君

数据使用许可表

王非老师在提交关于研究课题 "第二语言教育中基于智能手机的阅读项目"的论文时，需要使用其在授课中所收集的相关数据，我在已确认以下几点的基础上予以批准。

- 研究是按照《赫尔辛基宣言》与尊重人类尊严和人权的原则进行的。
- 知情同意书的设计对研究来说是合适的。
- 研究的设计必须适当，以保护个人信息。

2021年6月29日

大连工业大学外国语学院 院长

刘爱君 刘爱君 印

SHOT ON MI 8
AI DUAL CAMERA

２０２１年6月２９日

大連工業大学外国語学院
講師　王　非

大連工業大学
外国語学院院長　　劉 愛君

# データ利用許可書

研究課題「第二言語教育におけるスマートフォンを用いた読解プログラム」に関する研究の論文投稿にあたり、下記の事項を確認できたため、講義中の収集データ利用を承認します。

・ヘルシンキ宣言に沿って、人間の尊厳及び人権を尊重した研究を実施していること。
・研究において、インフォームドコンセントの設計が適切であること。
・研究において、個人情報保護の設計が適切であること。

２０２１年6月２９日
大連工業大学外国語学院　院長

劉愛君　刘爱君　印

2021 June 29th

School of Foreign Languages, Dalian Polytechnic University
Lecturer Wang Fei

Dalian Polytechnic University
Dean of School of Foreign Languages
LIU, Aijun

# Permission of Data Use

In submitting the paper for the research project on "Smartphone-based Reading Comprehension Program in Second Language Education," I hereby approve the use of the collected data during her lecture, as the following items have been confirmed.

- The research must be conducted in accordance with the Declaration of Helsinki and with respect for human dignity and human rights.
- The design of informed consent is appropriate for the research.
- The design of the research must be appropriate to protect personal information.

2021 June 29th
Dean of School of Foreign Languages

Liu aijun 刘爱君 印

Study 2

# Agreement for Cooperation for Education and Research

Japan Advanced Institute of Science and Technology
Affiliation: Graduate School of Advanced Science and Technology
Name of principal investigator: Takaya Yuizono

1. Purpose of the study

The purpose of this study is to investigate what mode of reading reflection under an reading program via smartphone applications will better stimulate students' reading reflection and reading interest.

2. Explanation of the research plan

This research is conducted among 60 freshemen in 2 classes. A language learning platform Chaoxinxing and a language learning application are adopted in the study. The study will last about two months. For each ten days, students are required to read two passages in smartphone applications and then write reading reflections. During the process different modes of reflective process management will be used to check which mode can better stimulate students' learning refelction and learning interest. A pre-test and Post -test will be used to see students' reading proficiency before and after the program. A questionnaire and interview will be conducted at the end of the program to see student's perception about the mode preference and its influence upon their reading reflection and reading interest.

3. Collection of personal information in this study

In this study, "name, student ID number and gender" will be collected as personal information in the reading reflection, pre-test and post-test and the questionnaire about student's perception.

This personal information will be associated with various data (test data, reflection data, questionnaire data) using a correspondence table to achieve anonymity for non-researchers. This numbering system will be implemented as needed, but will be completed within two weeks of the end of the program. At the end of the study, the correspondence table will be discarded to achieve complete anonymity.

4. About the data obtained from the study

The data obtained through this research will be statistically processed, and the results and case studies will be presented at conferences or journal papers, etc. In doing so, the data will not be disclosed so that individual participants will not be identified. In addition, all data including personal information will be strictly managed so that it will not be leaked to outside parties, and personal information will not be used for any purpose other than the use of this system and emergency contact. Research data from which personal information has been removed may be used for analysis in conjunction with similar education and research data in order to conduct long-term research.

5. Rights of Research Participants

Research cooperation is based solely on your free will, and even if you decline to cooperate, it will not bring any disadvantage to you. You have the right to withdraw your consent and will not be disadvantaged in any way even if you withdraw from the research. The deadline for withdrawal will be immediately prior to the completion of the anonymization process described in section 3. Under no circumstances will you waive your legal claims, your human rights, or your right to human rights protection.

6. About Contacting Us

If you have any questions or comments about this study, please contact us at the address below.

School of Advanced Science and Technology, Japan Advanced Institute of Science and Technology (JAIST) WANG Fei E-mail: 592316786@qq.com

I agree to the above explanation and will cooperate with the research.

Date of entry: Year Month Day

Student Number

Full name

教育和研究合作协议

日本北陆先端科学技术大学院大学

隶属：北陆先端大学院大学研究生院

主要研究者姓名：Takaya Yuizono

1、研究目的

本研究的目的是调查通过智能手机app进行移动阅读时采用何种阅读反思模式可以更好地激发学生的阅读反思和阅读兴趣。

2、研究计划说明

该研究在 2 个班级的 60 名新生中进行。本研究采用语言学习平台超新星和手机阅读app。研究将持续大约两个月。每十天学生需要在手机app上阅读两篇文章，然后写下阅读反思。4种不同的阅读反思模式将轮流被应用， 以来检查哪种模式更能激发学生的学习反思和学习兴趣。前测和后测将用于查看学生在研究进行前后的阅读能力。研究结束时将进行问卷调查和访谈，以了解学生对模式偏好的看法及其对阅读反思和阅读兴趣的影响。

3.本次研究中个人信息的收集

在本研究中，在阅读反思、前测和后测以及学生感知问卷中将收集部分学生个人信息，比如姓名、学生证号和性别。这些个人信息将通过对应表与各种数据（测试数据、反映数据、问卷数据）相关联，以实现对非研究人员的匿名。该编号系统将根据需要实施，但将在计划结束后的两周内完成。在研究结束时，对应表将被丢弃以实现完全匿名。

4.关于研究获得的数据

通过研究获得的数据将进行统计处理，结果和案例研究将在会议或期刊论文等上展示。在此过程中，不会公开数据，因此不会识别个人参与者。此外，包括

个人信息在内的所有数据都将受到严格管理，以免泄露给外界，并且不会将个人信息用于除使用本系统和紧急联系之外的任何其他目的。已删除个人信息的研究数据可与类似的教育和研究数据一起用于分析，以进行长期研究。

5.研究参与者的权利

科研合作完全基于您的自愿，即使您拒绝合作，也不会给您带来任何不利。您有权撤回您的同意，即使您退出研究也不会以任何方式处于不利地位。退出的截止日期将紧接在第3节中描述的匿名化过程完成之前。在任何情况下，您都不会放弃您的法律主张、您的人权或您的人权保护权。

6.关于联系我们

如果您对本研究有任何问题或意见，请通过以下地址与我们联系。

日本北陆先端科学技术大学院大学（JAIST） 王非E-mail：592316786@qq.com

我同意上述解释，并会配合研究。

参与日期：　　年　　月　　日

学号

全名

Study 3

# 同意书

北陆先端科学技術大学院大学

所属：高级科学和技术研究生院

研究负责人姓名：王非

（研究课题） 构建基于反思性学习的英语阅读移动学习模式
关于开展研究和实验的解释者 王非 自 2023 年 9 月 15 日、 (地点) 大连工业大学，综合教学楼

您将被邀请参加一项研究。本知情同意书提供给您一些信息，以帮助您确认是否参与此项研究。请仔细阅读，如有任何疑问请向负责该研究的研究者提出。

研究目的：本研究是构建基于反思性学习的英语阅读移动学习模式，并分析其对于学生英语能力，自主学习能力，以及认知/元认知能力的影响。同时也探讨了此学习模式对于教师教学与自我提升的影响。。

研究过程：该研究将在大连工业大学外国语学院进行。首先，我们对对照班和实验班进行问卷调查和前测，了解两个班级的英语能力，自主学习能力，以及认知/元认知能力。之后，我们在实验班实施带有反思学习的英语移动阅读学习模式，在对照班采用传统的英语移动阅读学习模式。在研究结束之前，我们再次对两个班进行测验与问卷调查，同时对部分学生进行访谈。此外我们还对通过教师的日志与访谈，以及课堂观察来分析教师在此学习模式下所受到的影响。

我已阅读并理解研究计划的目的、意义和方法，以及个人信息保护和安全管理的方法，我同意参与该计划并提供所要求的有关我的信息和资料。

接受说明后理解的项目

（请在您理解的项目左侧列出您无法理解的项目的左侧×。 ）

1 研究计划大纲

（ ） 研究的目的和意义

（ ） 提供的信息 、 数据等

2 个人信息保护方法

（ ） 个人信息的收集必须符合研究目的和研究计划。

（ ） 对所提供的数据进行匿名化处理的方法或不能匿名化的原因

（ ） 适当存储和管理数据

3 知情同意事项

（ ） 参与研究计划是自愿的。

（ ） 不同意参与研究计划，不承担不利的待遇

（ ） 在同意参与研究项目后，能够随时以书面形式撤回同意。

（ ） 应有关人员的要求披露这些数据。

（ ） 即使撤回同意，也不会因此而遭受任何不利的影响。

（ ） 撤回同意时， 所提供的数据等将被废弃 。

（ ） 未经本人同意，不得将收集的数据等交给他人。

（ ） 关于如何发表研究成果，将举行学术会议和论文介绍

（ ） 向参与研究计划支付酬金（或不支付）

（如果必要，可以添加或删除与说明相关的任何其他内容。

| |
|---|
| 氏　名（自署） |
| 住　所 |
| 联系方式 |
| 代诺者（自署） |
| 代诺人地址 |
| 联系方式 |
| 与数据提供者的关系 |

## Appendix II Questionnaire and interview questions for Study 1

### Questionnaire

### Basic Information

Q1. What is your gender?

A. Male (15.6%) B. Female (84.4%)

Q2. How much time do you spend on your smartphone every day?

A. 2–3h (3.1%) B. 3–4h (3.1%) C. 4–5h (18.8%) D. 5–6h (31.3%) E. more than 6h (43.8%)

Q3. How much time do you spend learning English every day?

A. Little (6.3%) B. About 0.5h (21.9%) C. About 1 h (53.1%) D. More than 1.5 h (18.8%)

About Mobile Reading Habits and Preferences

Q4. What is your opinion of mobile language learning?

A. I support it, and it is the main language learning approach for me. (12.5%) B. I support it, but it is only a complement to the traditional approach in language study. (84.4%) C. I do not know it very well and cannot judge it. (0%) D. I do not support this approach. (3.1%)

Q5. How often do you read English via smartphones?

A. Never (0%) B. Occasionally (50.0%) C. Often (34.3%) D. Every day (15.6%) E. One day a week to finish the assignment (0%)

Q6. How long do you read English each time via smartphones?

A.1–5 mins (3.1%) B. 6–10 mins (18.8%) C. 11–20 mins (25.0%) D. 20–30 mins (43.8%) E. 30–60 mins (9.4%)

Q7. At what time do you like to read English via smartphones?

A. When I am waiting for someone or having a meal (12.5%) B. At a fixed time during the day for mobile reading (21.9%)

C. The day before the assignment is due (21.9%) D. At no fixed time, and I read if I want to (56.3%)

Q8. How much would you like to pay to read via smartphones?

A. Free of charge (50.0%) B. 10 Yuan (46.9%) C. 20 Yuan (9.3%) D. No limit (0%)

Q9. What is your main language learning platform via smartphones?

A. News websites (12.5%) B. Video websites (43.8%) C. Language learning applications (71.2%) D. Social media (28.1%)

Q10. What kind of resources do you wish those platforms provided?

A. Resources on textbooks or exams (50.0%) B. Resources on classical stories (53.1%) C. News (43.8%) D. Video (78.1%) E. Others (15.6%)

Q11. What is the advantage of mobile assisted reading/learning over the traditional approach?

A. Abundant and latest reading materials (46.9%) B. Learning at any time and any place (80.0%) C. Greater learning interest stimulated by videos (34.3%) D. Learning achievement can be monitored (28.1%)

Q12. What are the problems that affect reading study via smartphones?

A. Small screen (21.9%) B.Complex operation (12.5%) C. Distraction problem (81.3%) D. Unstable network connection (46.9%) E. High cost (15.6%) F. Insufficient smartphone storage (3.1%) G. Not forming habits of mobile reading (34.4%)

About Learning Achievement through Mobile Reading

Q13. Did the new learning approach enhance my reading and listening abilities?

A. I agree (68.7%) B. I disagree (0%) C. It makes little difference (18.8%) D. I am not sure (12.5%)

Q14. Did the new learning approach advance my interest in language learning?

A. I agree (75.0%) B. I disagree (6.3%) C. It makes little difference (15.6%) D. I am not sure (3.1%)

Q15. Did my autonomous learning ability show development after this reading practice?

A. I agree (56.0%) B. I disagree (3.1%) C. It makes little difference (28.1%) D. I am not sure (12.5%)

Q16. Did mobile reading enrich my knowledge of English language and culture?

A. I agree (84.4%) B. I disagree (0%) C. It makes little difference (12.5%) D. I am not sure (3.1%)

Q17. Did the new learning approach impose a heavy study load on me?

A. Heavy load and it is not effective (3.1%) B. Heavy load, but it is effective (12.5%) C. Light load but it is not effective (34.4%) D. Light load, and it is effective (50.0%)

Q18. Were the monitoring and evaluating methods adopted by the teacher useful during the learning process?

A. Effective (59.3%) B. Ineffective (0%) C. Effective, but not careful enough (34.4%) D. Too simple to be useful (6.3%)

Q19. Will l continue this learning approach in future studies?

A. I agree (78.1%) B. I disagree (3.1%) C. I am not sure (18.8%).

2 Interview Questions

IQ1: Do you like the learning experience of reading via smartphone?

IQ2: Do you prefer mobile reading or paper reading?

IQ3: Do you think mobile reading improves language ability? In what aspects?

IQ4: Do you like the learning application used? Any suggestions?

IQ5: Do you like the management and assessment methods used? Are they effective? Any suggestions?

## Appendix III Questionnaire and interview questions for Study 2

**Questionnaire**

Basic Information

1. What is your gender?

Male Female

2. How frequent do you read English via smartphone or other mobile devices per week?

A. once B. twice C. three times D. four times

E. five times F. everyday

3. Do you think the mobile reading program via smartphone applications im-proved your language abilities in certain aspects?

Strongly disagree 1 2 3 4 5 strongly agree

4. In which aspects do you think you improved your language ability?

A. Reading B. writing C. speaking D. listening E. none

5. When the program finish, will you like to continue this kind of reading prac-tice.

A. Yes B. No C. I am not sure

6. Do you think mobile reading programs of this kind need certain management and supervision from teachers or from other personnel?

Strongly disagree 1 2 3 4 5 strongly agree

7. reading reflection is effective in motivating me to read more English passages.

Strongly disagree 1 2 3 4 5 strongly agree

8. Reading reflection stimulates my learning interest in reading.

Strongly disagree 1 2 3 4 5 strongly agree

9. reading reflection help me better understand the passage I read.

Strongly disagree 1 2 3 4 5 strongly agree

10 .Reading reflection help me improve reflective and summarizing ability.

Strongly disagree 1 2 3 4 5 strongly agree

11. Reading reflection do not help improve my reading ability or knowledge

Strongly disagree 5 4 3 2 1 strongly agree

12. Writing Reading reflection imposes much burden on my study.

Strongly disagree 5 4 3 2 1 strongly agree

13.The operation of typing and uploading reflection is troublesome.

Strongly disagree 5 4 3 2 1 strongly agree

14. Communication and discussion after reading is unnecessary for mobile read-ing.

Strongly disagree 5 4 3 2 1 strongly agree

15. Which mode of reading reflection do you most prefer?

A. Paper reflection B. digital reflection

C. audio reflection D. group discussion and presentation

Reason:_____

_____

16. Which mode of reading reflection do you least prefer?

A. Paper reflection B. digital reflection

C. audio reflection D. group discussion and presentation

Reason:_____

_____

**Interview Questions**

1. Do you think certain process management or supervision measures by teachers such as regular journal writing is needed for a mobile reading program or just daily check-in on Apps will be enough for mobile reading?
2. Do you think reflection after the mobile reading is useful?
3. Please give a rank of preference for the four modes of reading reflection and explain reasons for your belief.
4. What is the main problem/complaint you had about this reading program or the reflection practices?
5. Any suggestions for the program and for the mode of reading reflection?

**Appendix IV Pre-questionnaire, post-questionnaire, and interview questions for Study 3**

**The Prequestionnaire**

1. Class: 1 2
2. Gender: □ Male □ Female
3. Age: □ 17 years (M1) □ 18 years (M2) □ 19 years (M3) □ 20 years (M4)
4. the mobile devices you are using in the study smartphone laptop Pad
5. The frequency of my reading learning through mobile devices:
   All the time (every day)
   Frequently (four or five times a week)
   Often (two or three times a week)
   Occasionally (once or twice a week )
   Seldom (Once every week or less frequently)
6. I think mobile learning helps promote my reading ability.
   1 2 3 4 5
7. I think reflection is important in English reading learning.
   1 2 3 4 5
8. I think reflection is also important in mobile English reading learning.
   1 2 3 4 5
9. In English learning, I usually make a study plan at the beginning.
1 2 3 4 5
10. I often preview the texts for reading classes.
1 2 3 4 5
11. I understand certain reflective reading skills and apply them in reading.
1 2 3 4 5
12. I usually summarize my reading learning through a reflection diary or weekly journal or some other ways.
   1 2 3 4 5
13. I usually review and reflect on my learning after a unit‘s study
   1 2 3 4 5
14. After the exam, I formulate the focus of future study and new learning goals.
   1 2 3 4 5
15. I think about my progress in learning English, so as to find out weak links and improvement measures.
   1 2 3 4 5
16. I usually evaluate my learning methods, so as to find out the existing problems and solve and improve them.
   1 2 3 4 5
17. I am confident in improving my reading skills.
   1 2 3 4 5

18. I can quickly scan articles and find exactly what is useful.

1 2 3 4 5

19. In reading practice, I can use effective reading strategies and techniques autonomously

1 2 3 4 5

20. I am good at choosing effective learning paths to make myself a better language learner (e.g. exchange learning experiences with other people; write down their English learning experience in a diary or weekly journal: Actively listen to English broadcasts: Read English newspapers paper, magazines and novels; choose the learning environment that suits you, etc.).

1 2 3 4 5

21. I can try to determine my study plan and goals according to my actual level.

1 2 3 4 5

22. I read my class notes and the course reading over and over

1 2 3 4 5

23. I make lists of important terms and memorize the lists.

1 2 3 4 5

24. Even if the assignment reading didn't interest me or is too hard for me, I will try to finish reading it.

1 2 3 4 5

25. After finishing the homework, I take the initiative to do some exercises or read some extracurricular articles

1 2 3 4 5

26. If I don't achieve what I expected, I will try harder.

1 2 3 4 5

27. I like group discussion activities and cooperative learning with others

1 2 3 4 5

28. I think I can regulate my own learning well after and in the class.

1 2 3 4 5

29. I like to seek help from the teacher, ask the teacher for advice, and exchange learning experiences with him

1 2 3 4 5

30. I prefer to do things where there is a quick answer.

1 2 3 4 5

31. If I follow what the lecturer says, I do not have to think too much on this course.

1 2 3 4 5

32. In this course we do things so many times that I started doing them without thinking about it.

1 2 3 4 5

33. I often find myself questioning things I hear or read in this class to decide if I find them convincing.

1 2 3 4 5

34. When an interpretation, or conclusion is presented in class or in readings, I try to decide if there is good supporting evidence.

1 2 3 4 5

35. I treat the course material as a starting point and try to develop my own ideas about it.

1 2 3 4 5

36. I can identify the structure of arguments without being distracted by their content

1 2 3 4 5

37. Whenever I read or hear an assertion or conclusion in classes, I think about possible alternatives.

1 2 3 4 5

38. I can detect the use of inappropriate emotional language in scientific arguments.

1 2 3 4 5

39. I am good at weighing up both sides of an argument.

1 2 3 4 5

40. I am a critical and deeper thinker in the study.

1 2 3 4 5

**The Post-questionnaire**

1. Class: 1 2
2. Gender: □ Male □ Female
3. Age: □ 17 years (M1) □ 18 years (M2) □ 19 years (M3) □ 20 years (M4)
4. the mobile devices you are using in the study smartphone laptop Pad
5. The frequency of my reading learning through mobile devices:

   All the time (every day)

   Frequently (four or five times a week)

   Often (two or three times a week)

   Occasionally (once or twice a week )

   Seldom (Once every week or less frequently)

6. I think mobile learning helps promote my reading ability.

   1 2 3 4 5

7. I think reflection is important in English reading learning.

   1 2 3 4 5

8. I think reflection is also important in mobile English reading learning.

   1 2 3 4 5

9. In English learning, I usually make a study plan at the beginning.

1 2 3 4 5

10. I often preview the texts for reading classes.

1 2 3 4 5

11. I understand certain reflective reading skills and apply them in reading.

1 2 3 4 5

12. I usually summarize my reading learning through a reflection diary or weekly journal or some other ways.

1 2 3 4 5

13. I usually review and reflect on my learning after a unit‘s study

1 2 3 4 5

14. After the exam, I formulate the focus of future study and new learning goals.

1 2 3 4 5

15. I think about my progress in learning English, so as to find out weak links and improvement measures.

1 2 3 4 5

16. I usually evaluate my learning methods, so as to find out the existing problems and solve and improve them.

1 2 3 4 5

17. I am confident in improving my reading skills.

1 2 3 4 5

18. I can quickly scan articles and find exactly what is useful.

1 2 3 4 5

19. In reading practice, I can use effective reading strategies and techniques autonomously

1 2 3 4 5

20. I am good at choosing effective learning paths to make myself a better language learner (e.g. exchange learning experiences with other people; write down their English learning experience in a diary or weekly journal: Actively listen to English broadcasts: Read English newspapers paper, magazines and novels; choose the learning environment that suits you, etc.).

21. I can try to determine my study plan and goals according to my actual level.

1 2 3 4 5

22. I read my class notes and the course reading over and over

1 2 3 4 5

23. I make lists of important terms and memorize the lists.

1 2 3 4 5

24. Even if the assignment reading didn’t interest me or is too hard for me, I will try to finish reading it.

1 2 3 4 5

25. After finishing the homework, I take the initiative to do some exercises or read some extracurricular articles

1 2 3 4 5

26. If I don't achieve what I expected, I will try harder.

1 2 3 4 5

27. I like group discussion activities and cooperative learning with others

1 2 3 4 5

28. I think I can regulate my own learning well after and in the class.

1 2 3 4 5

29. I like to seek help from the teacher, ask the teacher for advice, and exchange learning experiences with him

1 2 3 4 5

30. I prefer to do things where there is a quick answer.

1 2 3 4 5

31. If I follow what the lecturer says, I do not have to think too much on this course.

1 2 3 4 5

32. In this course we do things so many times that I started doing them without thinking about it.

1 2 3 4 5

33. I often find myself questioning things I hear or read in this class to decide if I find them convincing.

1 2 3 4 5

34. When an interpretation, or conclusion is presented in class or in readings, I try to decide if there is good supporting evidence.

1 2 3 4 5

35. I treat the course material as a starting point and try to develop my own ideas about it.

1 2 3 4 5

36. I can identify the structure of arguments without being distracted by their content

1 2 3 4 5

37. Whenever I read or hear an assertion or conclusion in classes, I think about possible alternatives.

1 2 3 4 5

38. I can detect the use of inappropriate emotional language in scientific arguments.

1 2 3 4 5

39. I am good at weighing up both sides of an argument.

1 2 3 4 5

40. I am a critical and deeper thinker in the study.

1 2 3 4 5

41. I believe that, following this period of reflective English reading learning supported by mobile technology, my overall English proficiency has improved (experimental group).

I believe that, following this period of English reading learning supported by mobile technology, my overall English proficiency has improved (control group).

1 2 3 4 5

42. I believe that, following this period of reflective English reading learning supported by mobile technology, my reading proficiency has improved (experimental group).

I believe that, following this period of English reading learning supported by mobile technology, my reading proficiency has improved (control group).

1 2 3 4 5

44. I believe that, following this period of reflective English reading learning supported by mobile technology, my writing ability has improved (experimental group).

I believe that, following this period of English reading learning supported by mobile technology, my writing ability has improved (control group).

1 2 3 4 5

44. I believe that, following this period of reflective English reading learning supported by mobile technology, my listening proficiency has improved (experimental group).

I believe that, following this period of English reading learning supported by mobile technology, my listening proficiency has improved (control group).

1 2 3 4 5

45. I believe that, following this period of reflective English reading learning supported by mobile technology, my oral proficiency has improved (experimental group).

I believe that, following this period of English reading learning supported by mobile technology, my oral proficiency has improved (control group).

1 2 3 4 5

46. I will continue the reflective English reading learning supported by mobile technology (Experimental group)

I will continue the English reading learning supported by mobile technology (control group)

1 2 3 4 5

**Interview questions for students**

1. How did you find the experience of Reflective reading learning? Is It beneficial to your reading learning or not? In what ways did it affect your learning of English reading?

2. What reflective activities do you like or dislike during the learning process?

Reflective journal, reflective writing, reflective exercise, reflective questions, reflective discussion.

3. Does keeping reflection change your learning habits? In what ways?

3. Does keeping reflection make you think more or think deeper in your learning process?

4. Did you face any challenges while keeping your journal? What was your solution?

5. What are your thoughts on the frequency of our reflective activities? Typically, we organize a round of activities every two weeks. Do you perceive this schedule as adding to your study workload?

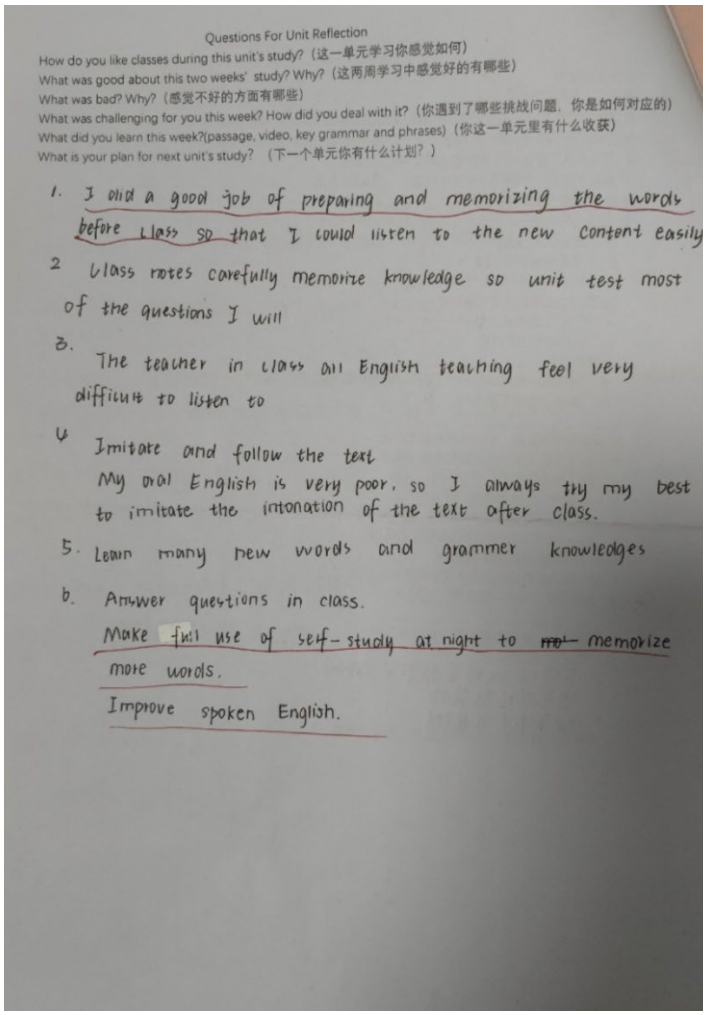
6. Do you think the benefits outweigh the difficulties you faced? And would you like to continue it in the future study in English or other subjects?

**Interview questions for teachers**

1. Do you think reflection is necessary for students to learn English reading, and what role does it play?
2. What elements are often mentioned in students' reading reflection logs? Do you think students' reflections are helpful in your teaching? List some of the main factors that influence your teaching.
3. What problems exist in students' reflections?
4. Will you conduct teaching reflection? Do you keep a teaching diary? How do you engage in reflective activities both in and outside of the classroom?
5. What do you reflect on? How do your reflective activities impact your teaching? for example?
6. Do you go back and observe other teachers' teaching for self-reflection?
7. What challenges did you face during the implementation of this mobile-assisted reflective learning project for English reading learning?
8. What suggestions do you have for future reflection activities?

## Appendix V Sample of reflective journal, post reflection exercise, and reflective writing

### Reflective journal sample



Questions For Unit Reflection

How do you like classes during this unit's study? (这一单元学习你感觉如何)
What was good about this two weeks' study? Why? (这两周学习中感觉好的有哪些)
What was bad? Why? (感觉不好的方面有哪些)
What was challenging for you this week? How did you deal with it? (你遇到了哪些挑战问题，你是如何对应的)
What did you learn this week?(passage, video, key grammar and phrases) (你这一单元里有什么收获)
What is your plan for next unit's study? (下一个单元你有什么计划？)

1. I did a good job of preparing and memorizing the words before class so that I could listen to the new content easily
2. Class notes carefully memorize knowledge so unit test most of the questions I will
3. The teacher in class all English teaching feel very difficult to listen to
4. Imitate and follow the text
   My oral English is very poor, so I always try my best to imitate the intonation of the text after class.
5. Learn many new words and grammer knowledges
6. Answer questions in class.
   Make full use of self-study at night to ~~not~~ memorize more words.
   Improve spoken English.

I learned/read a story about a young boy's first day experience at school. In the beginning of the story, the boy was unwilling to go to school But when he entered school, he found school offered him rich variety of experience and he had a enjoyable day at school. However， When he came out of school he found everything changed, even himself become an old man.

Overall, I thought the story was interesting and I like it. I like the ending, which was really surprising. I share the feeling with the writer as in China the society also changes day by day. I also liked the language in it, simple but vivid language. But one thing I dislike /feel sad is that there is less introduction about his parents after he entered school, so we don't know what happened to them.

**Post reflection exercise and smaple**

Posttest Reflection Exercise

(adapted from the posttest reflection exercise by Thompson (2012))

Name _____

This activity is designed to help you refl ect on your test performance and, more important,
on the effectiveness of your test preparation. Please answer the questions honestly. Your
responses will be collected to improve teaching and learning in this course. They will have
no impact on your grade.

1. Approximately how much time did you spend preparing for this test?
_____

2. After taking the test, what grade did you expect to earn? (approximately what %)
_____ %

3. Did you prepare well enough for this test? _____ yes _____ no

4. What percentage of your test-preparation time was spent in each of these activities?

a. Reading texts _____ %

b. remember words and phrases _____ %

c. Reviewing workbook or on-line exercises _____ %

d. Reviewing your own notes _____ %

e. Reviewing previous tests _____ %

f. Reviewing other class material
(Which materials? _____ ) _____ %

g. Discussing course materials and questions with classmates, tutors, or the instructor
_____ %

h. Other (Please specify below) _____ %
_____

5. After you have looked over your graded test, estimate the percentage of points you lost
due to each of the following (percentages should add up to 100%).

a. From careless mistakes _____ %

b. From not understanding the text thoroughly

b. From not knowing appropriate vocabulary _____ %

c. From not knowing correct verb phrase usage _____ %

d. From not understanding grammar usage _____ %

e. From not being able to apply knowledge in new situations _____ %

f. From other reasons (Please specify below) _____ %
_____

6. Based on your responses to the questions above, describe at least three things that you plan to do differently in preparing for the next test. For instance, will you spend

more time studying, change a specific study habit, or try a new one? Some other strategy?

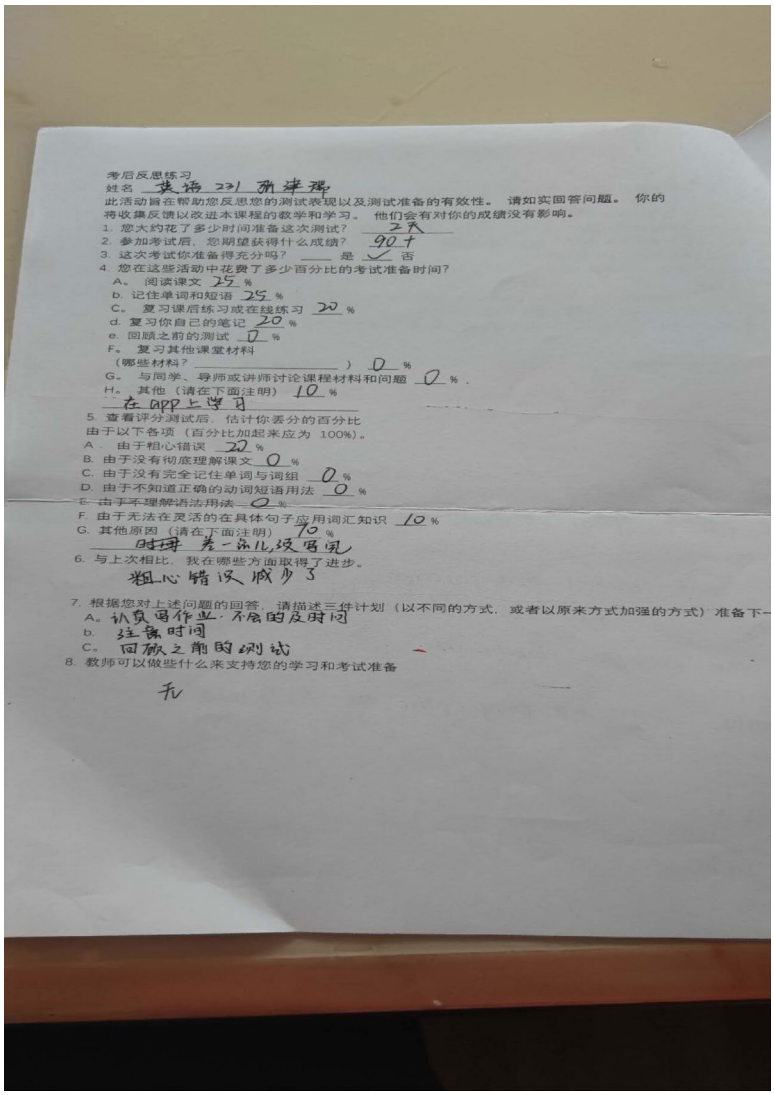
Please be specific in your descriptions.

a.

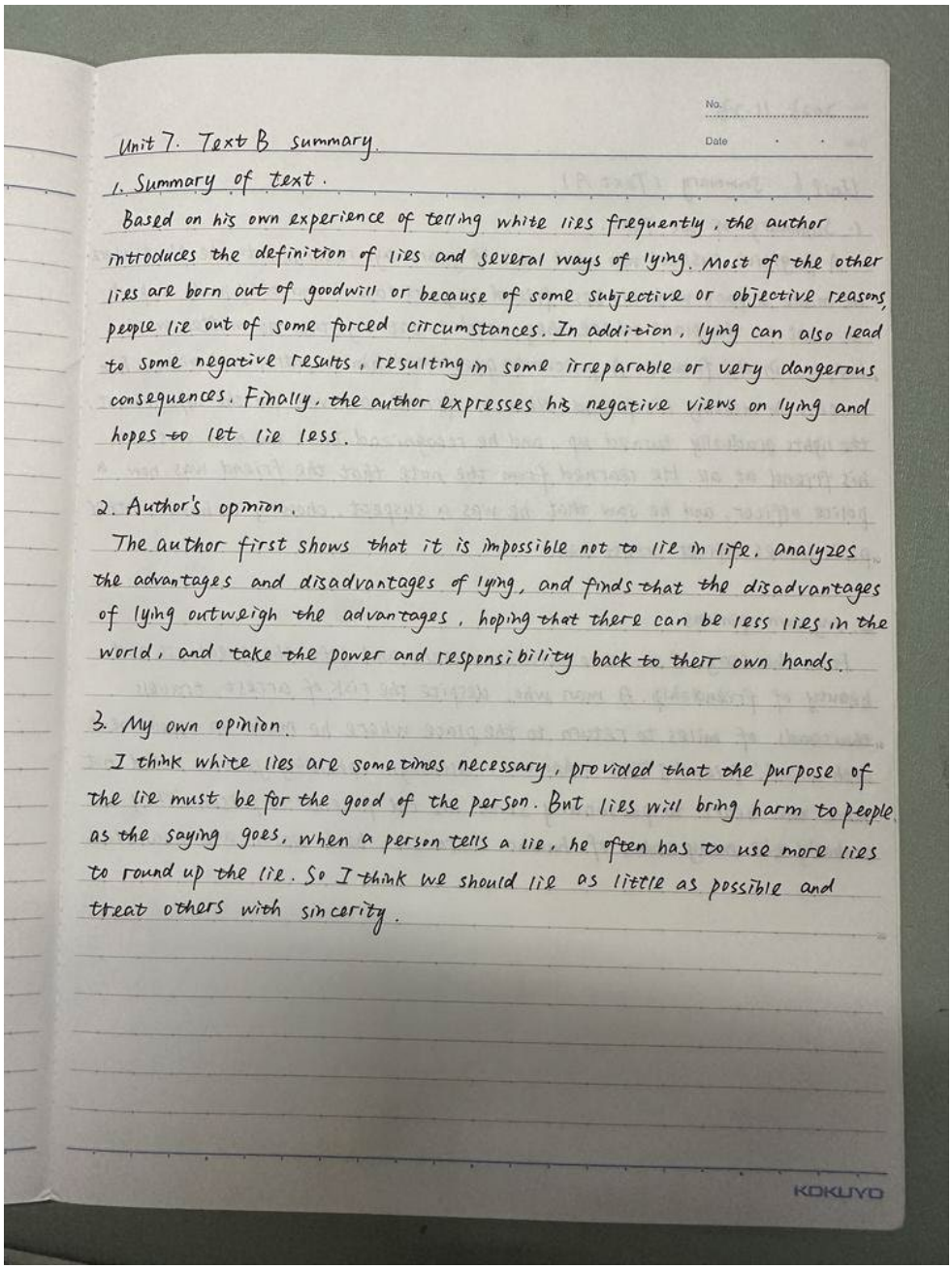
b.

c.

7. What can the instructor do to support your learning and your preparation for the test


考后反思练习
姓名 英语 231 孙梓瑞
此活动旨在帮助您反思您的测试表现以及测试准备的有效性。 请如实回答问题。 你的
将收集反馈以改进本课程的教学和学习。 他们会有对你的成绩没有影响。
1. 您大约花了多少时间准备这次测试？ 2天
2. 参加考试后，您期望获得什么成绩？ 90+
3. 这次考试你准备得充分吗？ ___ 是 ✓ 否
4. 您在这些活动中花费了多少百分比的考试准备时间？
A。 阅读课文 25 %
b. 记住单词和短语 25 %
C。 复习课后练习或在线练习 20 %
d. 复习你自己的笔记 20 %
e. 回顾之前的测试 0 %
F。 复习其他课堂材料
（哪些材料？ ） 0 %
G。 与同学、导师或讲师讨论课程材料和问题 0 %
H。 其他（请在下面注明） 10 %
在app上学习
5. 查看评分测试后，估计你丢分的百分比
由于以下各项（百分比加起来应为 100%）。
A 由于粗心错误 20 %
B. 由于没有彻底理解课文 0 %
C. 由于没有完全记住单词与词组 0 %
D. 由于不知道正确的动词短语用法 0 %
E. 由于不理解语法用法 0 %
F. 由于无法在灵活的在具体句子应用词汇知识 10 %
G. 其他原因（请在下面注明） 70 %
时间 考一场几没写完
6. 与上次相比，我在哪些方面取得了进步。
粗心错误减少了
7. 根据您对上述问题的回答，请描述三件计划（以不同的方式，或者以原来方式加强的方式）准备下一
A。 认真写作业，不会的及时问
b. 注意时间
C。 回顾之前的测试
8. 教师可以做些什么来支持您的学习和考试准备
无

**Reflective writing sample**



No.

Date

Unit 7. Text B summary.

1. Summary of text.

Based on his own experience of telling white lies frequently, the author introduces the definition of lies and several ways of lying. Most of the other lies are born out of goodwill or because of some subjective or objective reasons, people lie out of some forced circumstances. In addition, lying can also lead to some negative results, resulting in some irreparable or very dangerous consequences. Finally, the author expresses his negative views on lying and hopes to let lie less.

2. Author's opinion.

The author first shows that it is impossible not to lie in life, analyzes the advantages and disadvantages of lying, and finds that the disadvantages of lying outweigh the advantages, hoping that there can be less lies in the world, and take the power and responsibility back to their own hands.

3. My own opinion.

I think white lies are sometimes necessary, provided that the purpose of the lie must be for the good of the person. But lies will bring harm to people as the saying goes, when a person tells a lie, he often has to use more lies to round up the lie. So I think we should lie as little as possible and treat others with sincerity.

KOKUYO

Reading Comprehension tasks in the control group

**Exercises · Reading Comprehension**

**1. Read the text and complete the summary.**

This text is based on a speech made by a professor in which he expresses his view about the purpose of universities. The professor describes an interesting case he had to deal with earlier on when he was (1) _____. A student came to his office to question the use of the course in (2) _____, since his purpose was only to (3) _____. The professor tried to tell him that university students enroll for (4) _____ by explaining how he would spend his 24-hour day after college—eight hours for sleep, eight hours for (5) _____ by using his professional skills, and the other eight hours in which he might learn to be (6) _____ by developing a taste in the liberal arts and improving his mind. The student was, unfortunately, not convinced.