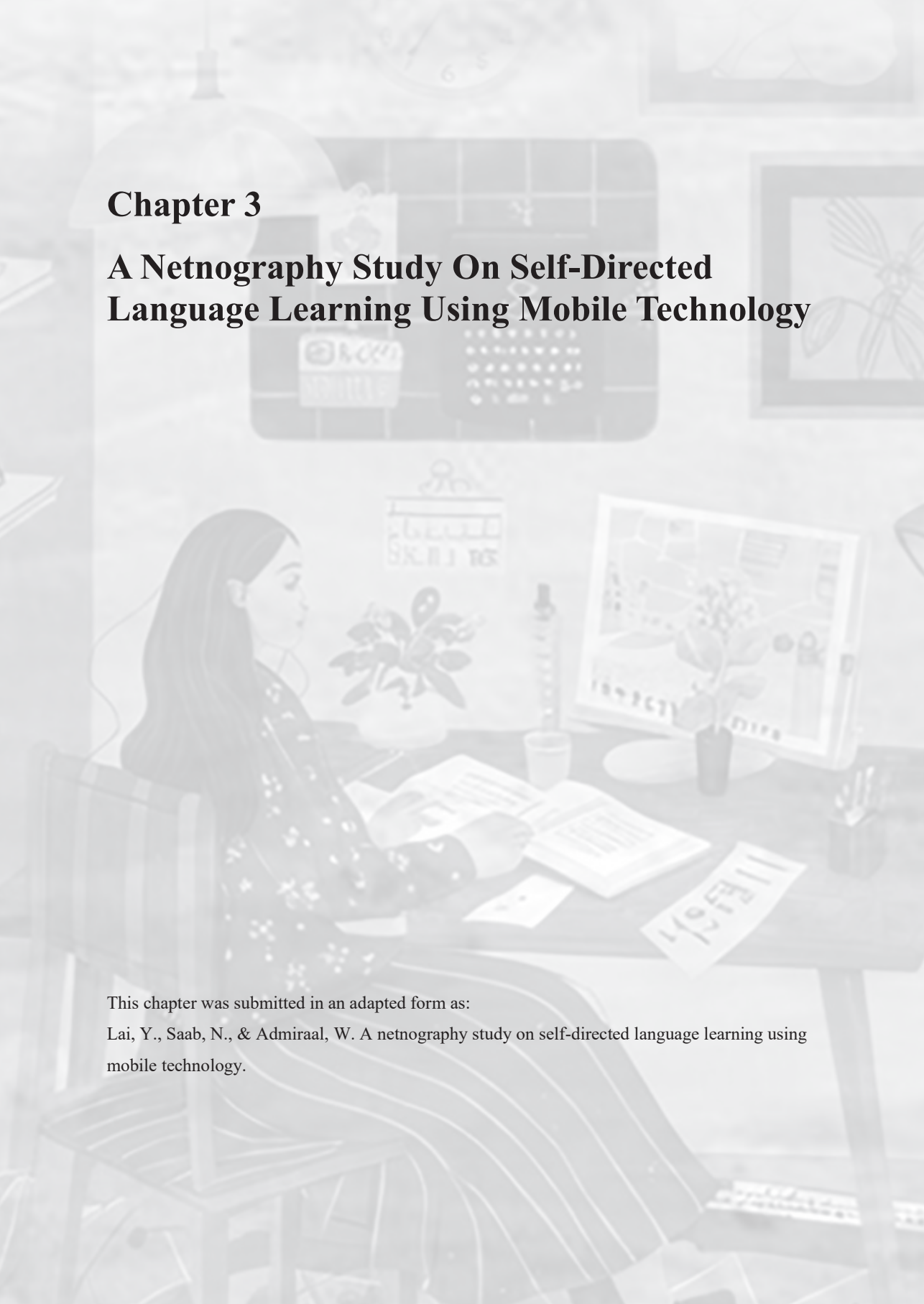
Self-directed language learning using mobile technology in higher education

Lai, Y.

Chapter 3

A Netnography Study On Self-Directed Language Learning Using Mobile Technology



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Abstract

The objective of the study is to describe the learning experience of language learners in the context of self-directed learning using mobile technology. The netnography research method was employed to collect data from an online platform for knowledge exchange, analyzing how learners learned English in the context of self-directed learning using mobile technology. The findings revealed that the process experienced by these language learners included four phases, namely learning task initiation, forethought, performance, and self-reflection phases. More specifically, motivation for English learning and self-directed learning were identified in the learning task initiation phase. How learners set goals, did strategic planning, and perceived this learning process was indicated in the forethought phase. The strategies learners used, and how they sought help, managed their emotions, and monitored their learning process were highlighted in the performance phase. In the self-reflection phase, learners used their final grades as a metric to self-evaluate their performance. Furthermore, they made suggestions, identified challenges, and summarized the disadvantages of self-directed learning, and the conditions for its success. Learners also expressed a sense of achievement and reported improved self-directed learning ability after the learning process.

Keywords: Self-directed learning, Mobile technology, Learning experience, Netnography study

3.1 Introduction

The growth and enhanced capabilities of mobile technologies have revolutionized education by providing access to a variety of educational information at any time and from any location, thereby creating a plethora of learning opportunities. In the realm of foreign language learning, it is apparent that language learners are informally absorbing foreign language using a range of online resources (Lee & Lee, 2021). Furthermore, due to the limited time allocated within the curriculum for foreign language practice and mastery (Kennedy & Levy, 2009; Liu et al., 2020), an ever-growing number of students are turning to self-directed learning outside the classroom, using mobile technology to immerse themselves in authentic language environments and thus enhance their language abilities, particularly in countries distant from native-speaking regions. Loyens and Rikers (2008) differentiated between self-directed learning and self-regulated learning, even though some researchers used both terms interchangeably. Both require learners to be actively engaged and goal-oriented, but the degree of learner control differs, particularly at the start of the learning process (Loyens & Rikers, 2008). Self-directed learners tend to initiate a learning task themselves, whereas self-regulated learners work on tasks assigned by their teacher. Mobile technology consists of portable digital devices including cell phones, wearables, smart speakers, iPads, laptops and other devices connected to the Internet. In this study, self-directed language learning using mobile technology occurs outside the classroom and involves learners initiating their language learning tasks and taking control of the whole learning process within the mobile-assisted learning context.

Prior research has explored students' perceptions, learning strategies, behavioral intention, adoption, satisfaction, persistence, and effectiveness of mobile technology in self-directed language learning (e.g., Lai et al., 2022a; 2022b; García Botero et al., 2019; Lai et al., 2018; Zhang & Perez-Paredes, 2019). However, very little research has been conducted on learners' experiences with self-directed learning using mobile technology. While some researchers, such as Lai et al. (2018) and García Botero et al. (2019), have explored experiences with self-directed learning using mobile technology, they mainly focused on the use of mobile technology, rather than the entire learning process of self-directed learning. Knowledge about how learners self-direct their learning process could be conducive to enhancing the effectiveness of the learning experiences. This study therefore aims to contribute to insights into how learners self-direct their learning process during different phases. Moreover, since this study focuses on foreign language learning as the content for

self-directed learning, it also examines how self-directed learning phases interacted with four language domains, namely, speaking, reading, writing, and listening. The objective of this study is twofold: 1) to present a comprehensive model of self-directed learning process using mobile technology, further providing a practical framework for learners seeking to pursue self-directed learning, and 2) to contribute to improving the effectiveness of self-directed learning, with implications for learners, educators, and IT practitioners.

3.2 Literature review

3.2.1 Self-directed learning in mobile-assisted language learning

The use of mobile technology to fully exploit the potential of self-directed language learning is beneficial as it can support the self-directed language learning process. Lee, Hong, and Ling (2002) and Shapley (2019) stated that self-directed learners tend to derive greater benefits from online learning when compared to those who are not self-directed. In the context of mobile-assisted language learning, self-directed learners can leverage mobile technology, such as various portable devices, to access diverse learning resources, employ all kinds of mobile apps, and engage in communication with native speakers from any location at any time. Such utilization of mobile technology can further improve the effectiveness and efficacy of self-directed learning processes. Nevertheless, research on self-directed learning in mobile-assisted language learning is relatively undeveloped (Kukulska-Hulme, 2016; Li & Bonk, 2023).

Previous studies on language learning have explored the learning experience in self-directed, informal, autonomous or out-of-class learning using various technologies (e.g. García Botero et al., 2019; Lai et al., 2018; Ma, 2017; Zhang & Pérez-Paredes, 2019). For example, Lai et al. (2018) examined the language learning experiences outside the classroom, and factors that influenced these experiences. The authors reported three types of technological experiences, namely instruction-oriented, entertainment and information-oriented, and socially oriented technological experience, all three of which were influenced differently by attitudinal and support factors. Zhang and Pérez-Paredes (2019) explored the use and motivations underlying language learners' choice of mobile English learning resources (MELR). The results revealed that the primary reason for using MELR was to prepare for exams, while expanding their English vocabulary was the learners' main aim. Interestingly, only a few learners were able to choose suitable MELR that aligned with their specific English learning needs, relying instead on recommendations from social media and

authoritative education experts. Of the various types of MELR, mobile dictionaries and vocabulary learning applications were favoured by the learners. The two key factors driving the selection and use of MELR were enjoyment and interactivity. García Botero et al. (2019) investigated how students perceived and used Duolingo as a mobile-assisted language learning tool via software tracking, questionnaires and interviews. Tracking data showed that students were more active during holidays and lacked time during course weeks. The results from questionnaires revealed that Duolingo was able to encourage this kind of learning through fun activities. Additionally, the interview findings reported a lack of self-management, self-monitoring and sustained motivation. All these studies focused on how learners used these technologies in informal, out-of-class, and self-directed learning. However, much less attention was paid to how learners performed in the self-directed learning process with the assistance of mobile technology. Only Ma (2017) described the personalized learning process of foreign language learners, although they mentioned only one or two learning activities in planning, goal setting, self-recording, and self-testing, which did not cover the entire process.

3.2.2 Models of self-directed learning process

Self-directed learning can be described as a process involving individuals taking the lead to identify their learning needs, establish learning objectives, select and implement proper strategies, and assess learning performance, with or without others' support (Knowles, 1975). Numerous attempts have been made to develop conceptual models aimed at elucidating the components of self-directed learning. Candy (1991) presented a Four-Dimensional Model, which encompassed personal autonomy, self-management, autodidacticism, and learner control. Grow (1991) created his Staged Self-Directed Learning Model to outline a process that assisted learners in navigating the various aspects of the self-directed learning process. Brockett and Hiemstra (1991) proposed the Personal Responsibility Orientation Model and emphasized two orientations of self-directed learning: process and goal. Garrison's Three-Dimensional Model (1997) viewed self-directed learning as a learning process and personal attributes. Song and Hill (2007) added a third perspective: the learning context, which represented the impact of environmental factors on self-directed learning. Hiemstra and Brockett (2012) updated the Personal Responsibility Orientation model to the Person Process Context (PPC) Model, which included the teaching-learning process, personal characteristics and learning context. All these models presented above provided us with a

comprehensive view of self-directed learning, yet few focused on the specific and detailed perspective of self-directed learning being seen as a learning process. Only Garrison (1997) further noted that the process of self-directed learning involved self-management, self-monitoring, and motivation. However, Song and Hill (2007) stated that Garrison (1997) still emphasized the level of learner autonomy over the self-instructional process. Comprehending the self-directed learning process is crucial as it not only enhances the effectiveness of learning experiences but also serves as an initial and indispensable step in cultivating learners' self-direction competence (Tan & Koh, 2014).

3.2.3 The components of self-directed learning process

As stated in section 1, the initiation of learning tasks marks the inception of self-directed learning for learners, which is regarded as a component of the self-directed learning process. Subsequently, self-regulation is another crucial and indispensable component (Jossberger et al., 2010; Saks & Leijen, 2014), which is closely intertwined with the quality of self-directed learning (Long, 2000). Taken together, the self-directed learning process involves learners initiating their language learning tasks and regulating the learning process. More explicitly, it includes the learning task initiation phase and Zimmerman's three-phase model of self-regulation (Zimmerman, 2000), which comprises forethought, performance, and self-reflection phases, as illustrated in Figure 3.1.

The self-directed learning process incorporates four key components:

- *Learning task initiation phase,* where learners initiate their own learning tasks;
- *Forethought phase,* in which learners analyze the learning tasks by setting goals and developing plans;
- *Performance phase,* involving using diverse strategies and processes during task engagement to achieve the goals set in the previous phase;
- *Self-reflection phase,* where learners assess and react to their behaviors and performance outcomes once they have completed the tasks based on their chosen goals, and determine the possible factors that led to their success or failure.

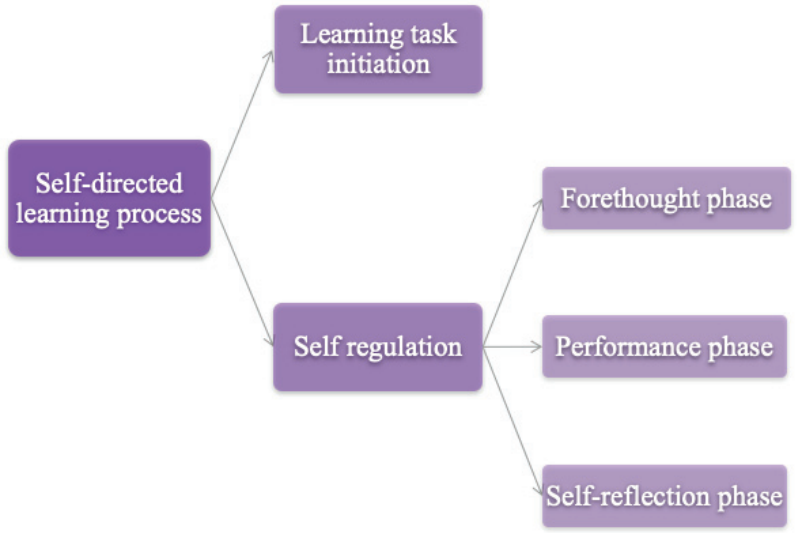


Figure 3.1. The components of self-directed learning.

3.2.4 This study

The current study aims to investigate the learning process of language learners in the context of self-directed learning using mobile technology outside the classroom by addressing the following research questions.

- How do language learners initiate their learning in the context of self-directed learning using mobile technology?
- What do language learners do in the forethought phase in the context of self-directed learning using mobile technology?
- What do language learners do in the performance phase in the context of self-directed learning using mobile technology?
- What do language learners do in the self-reflection phase in the context of self-directed learning using mobile technology?

3.3 Methodology

This study employed an ethnographic research method to analyze how Chinese learners learned English through the process of preparing for IELTS (International English Language Testing System) in the context of self-directed learning using mobile technology. Specifically, we used the netnography approach, which utilizes ethnographic research techniques in online communities. This approach offers a valuable opportunity to naturally capture users' perspectives since data within online communities are publicly accessible, granting users the freedom to openly express their opinions in online communities (Eaton & Pasquini, 2020; Kozinets, 2015; Qin et al., 2020).

3.3.1 Participants

The participants in this study are 29 self-directed learners who learned English on their own for the purpose of passing the IELTS. They could be undergraduates, postgraduates, or people who have entered the workplaces.

The International English Language Testing System (IELTS) is the most popular English language test for global immigration and higher education. It is recognized by governments, employees, educational institutions and other professional bodies around the globe. Four language skills, namely listening, speaking, reading and writing are evaluated during the test. IELTS is graded on a scale of 1-9, Band 9 indicating "expert user" and Band 0 "do not attempt the test".

3.3.2 Data source

This study selected Zhihu, a social question-and-answer online community, as the information source. It is a well-known knowledge-exchanging online platform in China, and has more than 2.2 billion users (Qin et al., 2020). Figure 3.2 shows the examples of the knowledge platforms and the online knowledge communities.

Figure 3.2. An example of the answer page on Zhihu.

The netnography process started with saving all online text posts related to preparing for IELTS in a self-directed way on Zhihu. We eventually screened nine questions:

"How should I prepare for IELTS in a self-directed way?" (https://www.zhihu.com/question/331225718/answer/2616048937),
"What should I do to prepare for IELTS in a self-directed way with a goal of 7?" (https://www.zhihu.com/question/39614041/answer/561085930),
"What should I do to prepare for IELTS in a self-directed way with a goal of 8?" (https://www.zhihu.com/question/48493199/answer/2260251654),
"Any experience or tips for beginners who are preparing for IELTS?" (https://www.zhihu.com/question/333937870/answer/2287971622),
"How should I prepare for IELTS?" (https://www.zhihu.com/question/19709258),
"Do you recommend preparing for IELTS in a self-directed way?" (https://www.zhihu.com/question/23246712/answer/2339625393),
"What is your learning process when preparing for IELTS in a directed way?" (https://www.zhihu.com/question/288558270/answer/1186061290),

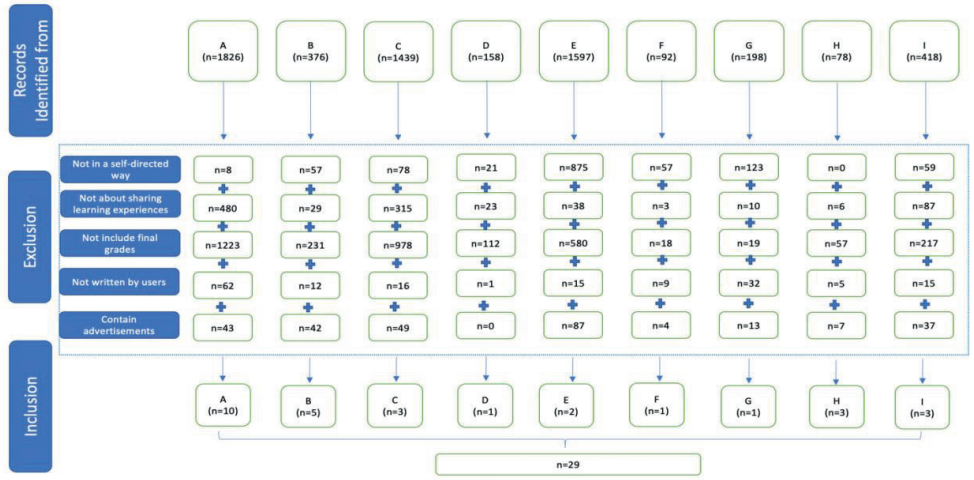
"How difficult is it for beginners to pass IELTS?"
(https://www.zhihu.com/question/37430159/answer/2225138511), and
"How should I prepare for IELTS within two or three months?"
(https://www.zhihu.com/question/29434069/answer/2260714991).

A total of 6,182 answers to these questions were identified. We only selected the entries with a final grade as this is an indication that students went through all the learning stages up to the examination. To include those answers which presented learners' learning process or experience about preparing for IELTS in a self-directed way, we further screened the answers based on the following criteria:

(1) These answers should be relevant to prepare for IELTS in a self-directed way.
(2) They should be written by users rather than educational institutions.
(3) They are about sharing learning experiences.
(4) They should not contain advertisements.

Finally, we arrived at 29 posts, indicating the participation of 29 individuals in the study. Furthermore, all 29 participants affirmed their utilization of mobile technology to varying degrees within their learning processes. Figure 3.3 and Table 3.1 present the exclusion reasons.

Figure 3.3 Flow chart depicting the search and selection process.



Note. A-I means the questions mentioned above.

A: "How should I prepare for IELTS in a self-directed way?"
B: "What should I do to prepare for IELTS in a self-directed way with a goal of 7?"
C: "What should I do to prepare for IELTS in a self-directed way with a goal of 8?"
D: "Any experience or tips for beginners who are preparing for IELTS?"
E: "How should I prepare for IELTS?"
F: "Do you recommend preparing for IELTS in a self-directed way?"
G: "What is your learning process when preparing for IELTS in a directed way?"
H: "How difficult is it for beginners to pass IELTS?"
I: "How should I prepare for IELTS within two or three months?"

Table 3.1 Reasons for exclusion.

Reasons	Number
Not in a self-directed way	1278
Not about sharing learning experiences	991
Did not include final grades	3435
Not written by users	167
Contained advertisements	282

3.3.3 Data analysis

The coding of 29 answers was carried out based on a theory-driven framework. The data analysis was conducted using ATLAS.ti 22, qualitative data analysis software. First, two researchers conducted initial coding of a small sample from the dataset based on our theoretical framework, and then developed a coding framework, as shown in Table 3.2. The first author subsequently coded the rest. To check the reliability, the second author was invited to code 20% of the dataset independently using the coding framework developed. If there was inconsistent coding, the two researchers double checked the original data until consensus was reached. The unit of analysis was a meaningful statement. Parts of the answers where no category was filled were left uncoded. These were not relevant to the learning process.

Table 3.2 The phases and activities of self-directed learning process.

Topic	Components	Phases	Activities	Description
Self-directed learning process	Learning task initiation	Learning task initiation phase	Motivation for English learning	
			Motivation for self-directed learning	
	Self-regulation	Forethought phase	Goal setting	The process of learners setting specific objectives that they want to achieve.
			Strategic planning	Choosing an action plan.
			Task value	The importance of self-directed learning.
			Self-efficacy	The perception about the personal ability to perform a task.
		Performance phase	Task strategies	Learners' capability to employ learning strategies that can assist them to acquire the language.
			Help seeking	The act of asking for assistance when needed.
			Management	Planning the use of environment, resources, effort and time during the learning process.
			Interest incentives	The self-given reminders of goals that can help motivate and sustain learners.
			Self-consequences	To enhance their feelings of progress through self-reward.
			Self-recording	Making a record of the learning contents or behaviors for further analysis.
			Self-monitoring	Checking and correcting one's understanding or performance in the learning process.
		Self-reflection phase	Self-evaluation	Assessing learners' performance.
			Self-reaction	Learners' cognitive and emotional reactions to self-judgments.

3.4 Results

This section presents the analysis of data. The results relating to four learning phases is shown (and discussed) below, with special attention being paid to exploring the differences between the domains of listening, reading, writing and speaking.

3.4.1 Learning task initiation phase

Table 3.3 Codes in the learning task initiation phase and their summary.

Code	Summary
Motivation for English learning	• Study abroad • Professional development
Motivation for SDL	• Avoid paid training courses • Enjoy the sense of achievement after completing this self-directed learning

Learning task initiation involves *motivation for English learning* and *self-directed learning,* as shown in Table 3.3. Of the participants, nine studied the English language in preparation for studying abroad and one for professional development. Five conducted self-directed learning to avoid paid training courses and one for enjoying the sense of achievement after completing this self-directed learning.

3.4.2 Forethought phase

Table 3.4 Codes in the forethought phase and their summary.

Code	Sub-code	Summary
Goal setting	Target score	• Target scores • Smaller goals
Strategic planning	Understand the test	• Acquire the basic information about the test, useful learning tips, and the key parts of the test • Through the IELTS website, textbooks, online question-and-answer platforms (e.g., Zhihu), or online introductory videos
	Select appropriate learning resources	• Paper learning resources • Electronic learning resources • Vocabulary memorization apps was the most frequently noted category

	Make study plans	• The criteria of making plans:
		  ○ The amount of time available
		  ○ Their preferred learning styles, and
		  ○ Current level of English proficiency that was determined by their grades in previous English exams or a mock IELTS test
		• Search for study plans online
		• Use Excel app

Task value	Value of SDL	• Feasibility of self-directed learning as an effective means for IELTS preparation
Self-efficacy		Way of self-assessing self-efficacy: • A self-test • Prior self-learning experience

This phase includes *goal setting, strategic planning, task value* and *self-efficacy*, as illustrated in Table 3.4. Regarding *goal setting*, eight participants reported having target scores, with two of them also setting smaller goals. Moreover, participants 1 and 32 mentioned setting their goals according to their personal needs: "*Based on the English proficiency requirement of the master's*

program that I would like to apply for at the university abroad, I set my minimum goal with an overall band of 7 and a band of 6.5 in every section" (Participant 32).

In this study, participants developed *strategic plans* by gaining an *understanding of the test*, *selecting appropriate learning resources* and *making study plans*. Regarding *understanding the test*, participants acquired the basic information about the test, useful learning tips, and the key parts of the test via the IELTS website, textbooks, online question-and-answer platforms (e.g., Zhihu), or online introductory videos. Most participants reported that they focused on understanding the writing section of the test, while fewer of them emphasized the listening section.

Participants used both paper and electronic learning resources. One participant mentioned that they chose the paper resources because they found it difficult to study consistently for three hours on mobile devices without being distracted by games, messages, or movies. However, most participants used electronic tools, including online courses on platforms like YouTube and Bilibili, BBC radio, the Economist magazine, and online services that provided feedback for writing and speaking practice. Additionally, various mobile apps were utilized, including those for vocabulary-memorizing (e.g., Maimemo, Baicizhan), listening-practicing (e.g., Daily English Listening, EasyListen), speaking-practicing (e.g., IELTS Bro), IELTS-specific (e.g., Papa English), and social question-and-answer websites (e.g., Quora, Reddit). Of these, vocabulary memorization was the most frequently noted category, with four participants stating that these apps helped them memorize vocabulary using example sentences based on the forgetting curve.

Twenty-one participants *made study plans* for their IELTS preparation. These plans were based on the amount of time available, their preferred learning styles, and their current level of English proficiency that was determined by their grades in previous English exams or a mock IELTS test. For example, Participant 26 stated, "*I tend to be more focused in the morning, so I plan to practice listening skills every morning since it requires more attention*".

Besides, two mentioned they searched for study plans online. For example, participant 40 stated that they searched for the plans on Zhihu, looking for posts from individuals with similar English proficiency and target scores, and then tailored the plan to fit their own situation. One participant even used an Excel app to create a detailed study plan.

About *task value* of self-directed learning, thirteen participants acknowledged the feasibility of self-directed learning as an effective means for IELTS preparation.

Two participants assessed their self-learning ability through a self-test, which included such questions as "*Am I capable of focusing on studying for at least 3 hours every day?"* and *"What is my current level of English proficiency? Can I understand everyday English conversations?*" (Participant 3). Another participant referred to their prior self-learning experience to gauge their *self-efficacy*.

3.4.3 Performance phase

Table 3.5 Codes in the performance phase and their summary.

Code	Sub-code	Summary
Task strategies	Repetition	• Repeat exercises to maximize their learning outcomes • Go over what they have learned or summarized • Listen to the audio materials intensively • Read the materials intensively and recite new vocabulary repeatedly during reading practice • Analyze model essays one after another in writing • Record their own speaking and listen back
	Key word	• Underline the keywords in the questions before listening and reading to get them prepared, and then pay extra attention to these keywords during the listening and reading. • Keep the key words in mind in speaking practice.
	Note taking	• Take notes of the key information and the parts that caused confusion while listening to the materials.
	Grouping	• Group the parts where they were losing

		points in listening, reading and speaking practice. • Classify the new vocabulary
	Contextualization	• Guess the meaning in the context.
	Authentic context	• Extensively immerse themselves in the English TV series, movies, talk shows, books, vlogs in YouTube or Bilibili, and BBC news. • Alternate between watching videos with English subtitles, Chinese subtitles and no subtitles. • Engage in self-talk in English.
	Imitation	• Imitate the pronunciation and intonation after listening to or speaking along with language materials.
	Variety	• Use various expressions rather than consistently relying on the same ones.
	Translation	• Translate in writing and reading practice.
	Resourcing	• Use Google engine.
	Induction	• Conclude the rules for writing a good essay.
	Deduction	• Employ the rules or tips learned into their own essays.

	Selective attention	Give specific attention to:
		• In the listening domain:
		  ○ The point-losing parts
		  ○ The difficult sections, and
		  ○ Areas requiring extra attention
		• In the reading domain:
		  ○ The point-losing
		  ○ The difficult parts
		  ○ The titles, first and last sentences of every paragraph

		• In writing practice:
		  ○ Essay structure
		  ○ The use of liaison
		  ○ Nouns of locality
		• In speaking,
		  ○ Pronunciation
		  ○ Intonation
		  ○ Liaison

	Advance organization	• Preview the questions before engaging in the listening and reading activities.
	Organizational planning	• Generate a plan before writing an essay.
	Problem identification	• Identify their problems during learning, and then implement targeted training to address these issues
Help seeking	Teacher support	• Ask for listening tips, feedback
	Peer support	• Turn to high-scoring peers and English-majored friends for feedback • Established learning groups
	Internet support	• Search for learning tips and resources
	Native speakers' support	• Essays evaluation and coaching on speaking skills
	Parent support	• Monitor the learning progress
Management	Environment management	• Changing learning environment. • Setting the phone's system in English. • Extensively listening to English videos while walking and communing • Writing English blogs and posts on Quora
	Time management	• Allocate specific hours for four language domains • Set a minimum study time • Use spare time for learning
	Resource management	• Screen learning materials
	Plan adjustment	• Adjust their study plans by

		• Revising subplans that were not completed on time • Incorporating targeted training for weak areas that were identified during the learning process
Interest incentives	Self-motivation	• Make daily to-do-lists • Use learning platforms with high interactivity • Uninstall the recreational mobile apps • Employ the concentration apps
	Emotion adjustment	• Exercise • Meditation • Yoga • Socialize with friends • Watch movies
Self-consequences		• Buy a gift or went to see a movie as the reward after completing a major goal
Self-recording	Self-recording of new or good expressions	• Make records of new or useful vocabulary and expressions
	Self-recording of point-losing parts	Reasons for losing points in reading: • Inability to understand the article • Inability to find the answers even when understanding the article • Inability to understand the questions • Not knowing the correct answers even when the questions are understood
	Self-recording of useful learning tips	• Make recordings of useful learning tips
	Self-recording of oral practice audio recordings	• Make their own oral practice audio recordings using cell phone or specific apps
Self-monitoring	Production monitoring	• Look up listening materials • Compare with the reference answers in reading and listening practice

		• Compare their revised versions in writing • Self-correct their mistakes after listening to audio recordings or receiving feedback from others in speaking
	Comprehension monitoring	• Keep asking themselves questions while reading articles
	Other monitoring	• Track their grades

The *performance phase* consists of *task strategies, help-seeking, management, interest incentives, self-consequences, self-recording* and *self-monitoring*, as indicated in Table 3.5.

In this study, sixteen different task strategies emerged from the data, comprising twelve cognitive strategies and four metacognitive strategies. Their definitions are presented in Appendix B. Regarding cognitive strategies, *repetition* is mentioned most often. Generally, fourteen participants stated that they repeated exercises to maximize their learning outcomes, and seven went over what they had learned or summarized. Specifically, some participants listened to the audio materials intensively and even transcribed them during listening practice and read the materials intensively and recited new vocabulary repeatedly during reading practice. And some analyzed model essays one after another in writing and recorded their own speaking and listened back to identify areas for improvement in speaking practice. *Keyword* is frequently used in listening and reading practice. They underlined the keywords in the questions before listening and reading to better prepare themselves, and then paid extra attention to these keywords during the listening and reading, which could help them answer these questions quickly and accurately, further maximizing their scores within the limited time. Two participants noted that they just kept the keywords in mind in speaking practice, which allowed them to express their opinions fluently and coherently. *Note taking* is employed exclusively in their listening practice. Participants took notes of the key information and the parts that caused confusion while listening to the materials. *Grouping* means learners classify the words or expressions into different groups based on specific criteria (O'Malley & Chamot, 1990). Participants in this study grouped the parts where they were losing points in listening, reading and speaking practice. One also classified the new vocabulary. *Contextualization* means placing words or phrases in meaningful sentences or contexts to help

learners understand them (O'Malley & Chamot, 1990). Eight participants used this strategy in their learning process, especially in listening and reading practice. For example, Participant 16 stated, "*Even if there were some difficult sentences to understand in reading practice, I guessed the meaning in the context.*" Different from *contextualization*, *authentic context* describes learners extensively immersing themselves in the English TV series, movies, talk shows, books, vlogs in YouTube or Bilibili, and BBC news to become more familiar with the target language. Participant 7 noted that they alternated between watching videos with English subtitles, Chinese subtitles, and no subtitles to gradually improve their language proficiency. They also reported that they regularly engaged in self-talk in English to train themselves to think in the logic of the English language. In addition, eight participants used *imitation* as a strategy to refine their pronunciation and intonation after listening to or speaking along with language tools. Three participants mentioned the importance of using a *variety* of expressions rather than consistently relying on the same ones. *Translation* was employed by two participants in writing and reading practice. One participant used Google engine as a *resourcing* tool to learn new expressions. *Induction* and *deduction* were also touched on. For example, "*I concluded the rules for writing a good essay by analyzing at least three excellent essays*" (*Induction* _Participant 17), and "I *employed all the rules or tips learned in my own essays*" (*Deduction* _Participant 2).

Four metacognitive strategies are indicated as well. *Selective attention* was identified most. In the listening domain, participants gave specific attention to the point-losing parts, the difficult sections, and areas requiring extra attention. For instance, Participant 34 stated that he/she paid more attention to the names of people, places and roads since they need to be capitalized. Concerning the reading domain, in addition to the point-losing and difficult parts, participants kept an eye on the titles, and the first and last sentences of every paragraph before proceeding to the reading passage. Additionally, one mentioned performing targeted training on weak parts of reading where they had lost points multiple times. In writing practice, participants gave more consideration to essay structure, the use of liaison and nouns of locality. With respect to speaking, attention was given to pronunciation, intonation, and liaison. *Advance organization* was used in listening and reading practice where participants previewed the questions before engaging in the listening and reading activities. Participants also employed *organizational planning* in all four language domains. Participant 19 stated that they always generated a plan before writing an essay: "*I analyzed the writing task, and then created an outline. Then, I used the outline to guide me as I*

wrote the essay." Furthermore, two participants *identified their problems* during learning, and then implemented targeted training to address these issues.

Based on our data, participants *sought support* from teachers, peers, the internet, native speakers and parents. The internet was the most common source of help, with 19 participants using it to search for learning tips and resources. They accessed useful online learning tips for listening, online experience-sharing posts on Zhihu for reading, writing critique sites and online courses for writing, and useful mobile apps, online experience-sharing posts on Zhihu, online courses and coaching partners for speaking. 11 participants sought support from peers. They not only turned to high-scoring peers and English-majored friends for feedback on their writing and speaking, but also established learning groups to share listening and writing tips, critique each other's work, recommend useful resources, make plans and monitor each other's progress. 7 participants asked teachers for listening tips, feedback on their essays and pronunciation. Similarly, 7 participants sought support from native speakers for the evaluation of essays and coaching on speaking skills. Finally, 1 participant involved their parents in monitoring their learning progress.

Participants *managed their time* by allocating specific hours for four language domains, setting a minimum study time, and using spare time for learning. Participant 16 mentioned that they "*practiced listening and reading during the daytime and writing and speaking in the night time*". For *environment management*, one participant stated that changing the learning environment, such as studying in a different place, motivated them. Participants also emphasized the importance of having a non-distracting environment for reading, such as spending at least one hour free of distractions. Additionally, setting the phone's system to English, extensively listening to English videos while walking and communicating, and writing English blogs and posts on Quora made them immerse in the authentic environment. One participant also mentioned the need to *screen learning materials* to ensure their relevance and effectiveness. Moreover, seven participants made *adjustments to their study plans*, either by revising subplans that were not completed on time or by incorporating targeted training for weak areas that were identified during the learning process.

With regard to *interest incentives,* participants mentioned several methods that motivated them and kept them persistent and determined, including making daily to-do-lists, using learning platforms with high interactivity, which are easier to stick with, uninstalling the recreational mobile apps, and employing the concentration apps (e.g., Forest). Some also emphasized the significance of maintaining a positive mindset during the learning process, which can be achieved through

exercise, meditation, yoga, socializing with friends, and watching movies. In addition, only one (Participant 17) reported using the *self-consequences* in the process. They bought a gift or went to see a movie as a reward after completing a major goal.

This study identified four types of *self-recording*: new or useful vocabulary and expressions, point-losing parts, helpful learning tips, and orally practicing audio recordings. 25 participants made records of new or useful vocabulary and expressions across four language domains, and reviewed them repeatedly to expand their vocabulary, which in turn enabled them to understand IELTS contents better and avoid using simplistic expressions all the time in speaking and writing (participant 19), ultimately getting good grades in the real test. Besides, 20 participants recorded the point-losing parts for the purposes of knowing their weak points and targeted their studies. They also determined and categorized the reasons why they lost points. For example, Participant 16 stated, "*I found that the reasons why I lost points in reading could be grouped into four types: (1) inability to understand the article; (2) inability to find the answers even when I understand the article; (3) inability to understand the questions; and (4) not knowing the correct answers even when I understand the questions.*"

Nine participants made their own oral practice audio recordings using their cell phone or specific apps, only for the speaking domain. They listened back to these recordings to self-evaluate their answers and identify the words that they pronounced incorrectly. Based on these evaluations, they were able to make improvements in their speaking skills. Seven also mentioned that they made recordings of useful learning tips.

Production monitoring, comprehension monitoring and *other monitoring* were identified in this study. 17 participants engaged in production monitoring by looking up listening materials or comparing with the reference answers in reading and listening practice, comparing their revised versions in writing, and self-correcting their mistakes after listening to audio recordings or receiving feedback from others in speaking. One participant checked their comprehension by continually asking themselves questions while reading articles. Tracking their grades was another monitoring action to keep themselves informed of their current progress.

3.4.4 Self-reflection phase

Table 3.6 Codes in the self-reflection phase and their summary.

Code	Sub-code	Summary
Self-evaluation	Final grades	IELTS grades
Self-reaction	Suggestions	• Practice listening and speaking insistently • Summarize consciously • Use helpful mobile devices or apps
	Challenges	• Speaking, especially pronunciation and fluency • Maintaining a positive mood during the learning process
	Conditions for successful SDL	• Self-discipline and self-control • Effective learning methods • Emotional control • Planning and executing capabilities • The ability to access learning materials and information
	Disadvantages of SDL	• Time-consuming • Less feedback and materials • Easy to give up
	A sense of satisfaction	• Feeling a sense of satisfaction
	Improved SDL ability	• Improved self-directed learning ability

Self-evaluation and *self-reaction* were identified in the *self-reflection phase*, as outlined in Table 3.6. Participants used their final grades as a metric to *self-evaluate* their performance. Regarding *self-reaction,* learners made suggestions and concluded the difficult parts when reflecting on the whole learning process. The suggestions include being determined in practicing listening and speaking, summarizing consciously, and using helpful mobile devices or apps. They also mentioned that it is challenging to improve speaking, especially pronunciation and fluency. Additionally, maintaining a positive mood during the learning process proved to be a challenge for them. Besides, three participants reported feeling a sense of satisfaction, while one believes that

their self-directed learning ability had improved as a result of engaging in self-directed language learning. Furthermore, nine participants stated that successful self-directed learning requires self-discipline and self-control, effective learning methods, emotional control, planning and executing capabilities, and the ability to access learning materials and information. One participant pointed out the weaknesses of this learning approach, namely that it is time-consuming, there is less feedback and fewer materials, and it is easy to give up.

3.5 Discussion

This study examined learners' self-directed learning process in the context of mobile-assisted language learning through the netnography research method. The findings enriched our in-depth evidence-based insights into the self-directed learning process from four phases. In addition to the research findings presented above, there are certain noteworthy outcomes that deserve further elaboration.

3.5.1 The role of mobile technology in the self-directed learning process

This study showed mobile technology assisted self-directed learning in three self-regulatory phases. In the *forethought phase*, learners used mobile technology to access various authentic learning materials (e.g., YouTube videos, Quora), and record study plans. In the *performance phase*, they used specific mobile apps to memorize vocabulary, practice listening and speaking skills, seek help from others, record learning time or contents, and monitor their progress. They followed online courses to learn tips, and joined online peer groups to exchange experiences and gain encouragement. The results are partly in line with the findings of Müller and Faltin (2011) and Tabuenca and colleagues (2015) reporting that students used mobile tools to track or record time spent on self-regulated learning. However, our study did not find any mobile technology used in the self-evaluation or self-reflection phase. Müller and Faltin (2011) revealed the possibility of using mobile tools to compare performance in self-evaluation, and to report and visualize learning statistics in the *self-reflection phase.* Further research is needed to figure out the specific ways that mobile technology can effectively support learners in the self-evaluation or self-reflection phase.

Additionally, this study found that most learners used a combination of electronic learning resources as well as printed books to accomplish their learning goals, which aligns with the findings of Li and Bonk (2023) demonstrating that learners used traditional materials and open educational

resources in their self-directed language learning. Despite the affordances of mobile technology for self-directed learning discussed earlier, a participant in this study articulated their preference for printed books due to poor self-discipline. They found it challenging to resist distractions such as messaging, mobile games, or movies while utilizing mobile technology to support their learning process. This rationale highlights a contemporary challenge linked to maintaining focus and concentration amidst the ubiquity of digital diversions. It diverges significantly from Gregory's (2008) reasons for participants' preference for printed books. Gregory (2008) cited reasons such as awareness (never heard of e-books), preference for printed books (reliable and convenient), eyestrain (the negative effect of staring at the computer), no need of using e-books, and ease of access to printed books, which do not conform to the current digital and mobile era.

3.5.2 Interaction between self-directed learning phases and four language domains

This study examined how self-directed learning stages interacted with four language domains: speaking, reading, writing and listening. While most of the self-directed learning stages did not show significant differences across the four domains, two distinctions were identified. One pertained to *making study plans*. The study plans were developed based on the learners' current proficiency levels in four English language domains, as well as the time available and individual learning styles. Creating study plans for reading and listening is relatively straightforward, as their levels can be assessed by comparing individual responses to standardized ones. In contrast, devising plans for writing and speaking poses greater difficulty due to the more challenging nature of evaluating current proficiency levels in these skills. Another distinction emerged concerning *help-seeking*, with more learners seeking support for writing and speaking, contrasted with fewer seeking help for reading and listening. This discrepancy could stem from various factors. One possible explanation lies in the relatively higher degree of difficulty in writing and speaking practice, necessitating more external assistance in these areas. Another is that further assistance can be obtained by referring to model answers for reading and listening tasks. Conversely, finding analogous guidance for writing and speaking tasks is often less accessible, potentially contributing to the higher frequency of seeking external help in these domains.

3.5.3 Affective support and outcomes

Learners' affective states exert a great influence on their engagement (Shen, 2021), performance (Dewaele, 2022), and learning process (Kukulska-Hulme et al., 2023). In this study, affective aspects were mentioned in two phases, the *performance phase* and the *self-reflection phase*. In *the performance phase*, learners employed affective support to engage in the self-directed learning process, such as using highly interactive learning platforms and concentration apps. This finding is consistent with previous studies by Wu et al. (2022) and Kukulska-Hulme et al. (2023), which suggest the design of mobile technologies such as an interactive design could offer learners opportunities to express their feelings and thoughts, which might improve their motivation and learning performance (Chen et al., 2018; Delahunty, 2018). And, in the *self-reflection phase*, learners experienced a positive affective outcome characterized by a sense of achievement and fulfillment after successfully completing the self-directed learning process. This is congruent with the finding of Cohen and Magen-Nagar (2016), who demonstrated that students felt a high sense of achievement when following a massive open online course. In addition, maintaining a positive mindset is conducive to engaging in the self-directed learning process.

3.5.4 Help-seeking and self-efficacy

Learners solicited support from teachers, peers, internet, native speakers and parents. The Internet is the agent that learners turn to most frequently. This is because the internet is characterized by availability, ease of access, searching capability, and links to a huge volume of resources (Li Liew et al., 2000), and it can be accessed anytime and anyplace. Besides, Li and Bonk (2023) reported that learners drew support from tutors, interest-shared peer groups and open educational resources, which showed similar results to this study. In addition, this study found learners received help from parents as well.

Learners evaluated their self-efficacy by taking a self-test of their language proficiency or reflecting on the prior self-learning experience, which aligned with the finding of Littlejohn et al. (2016) showing self-efficacy in association with either the existing knowledge or previous learning experience in the self-regulated MOOCs. This implied that learning is facilitated when learners were able to connect new knowledge with their existing knowledge, which corresponds to the theory of knowledge construction (Anderson, 1982; Littlejohn et al., 2016).

3.6 Limitation and directions for future research

There are also a few limitations to be acknowledged in this study. Firstly, the sample was limited to participants who shared their grades in the posts, which may result in a bias towards those who achieved good grades as we found all of them achieved good grades in the exam. The reason for this can be that learners with good grades might be more inclined to share their experience compared to those with low grades. Future research could capture data from learners with varying levels of grades to gain a more comprehensive understanding of the self-directed learning process and to see whether learners with different levels of grades exhibit different self-directed learning processes. Besides, we did not investigate the relationship between a self-directed learning process and learning performance. Research has proved the significant relationships among forethought, performance, and self-reflection processes, and the predictive effect of these phases on performance in mathematics education (Callan & Cleary, 2019). Therefore, it also warrants attention to delve into this aspect in self-directed learning.

Although this study shed light on the affective aspects in self-directed language learning, this domain is still an "under-researched and under-theorized aspect of self-regulation" in mobile-assisted language learning (Kukulska-Hulme et al., 2023). Thus, given its significant influence on learning performance and engagement, we call for more studies to explore this field.

3.7 Conclusion and implications

This study proposed a framework for a self-directed learning process, which comprises *learning task initiation, forethought, performance,* and *self-reflection phases*. *Motivation for English learning* and *self-directed learning* were identified in the *learning task initiation phase*. The *forethought phase* included *goal setting, strategic planning, task value* and *self-efficacy*. Learners set their goals of target scores and small learning goals based on their needs, and made the strategic plans by understanding the test, selecting appropriate materials and making study plans. Some of them considered self-directed learning feasible for IELTS preparation, and they also perceived their self-learning ability through a self-test or referring to the prior self-learning experience. The *performance phase* consisted of *task strategies, help-seeking, management, interest incentives, self-consequences, self-recording* and *self-monitoring*. Twelve cognitive and four metacognitive strategies were presented. Learners solicited support from teachers, peers, internet, native speakers and parents, and managed the environment, resources, effort and time during the learning process.

Learners used some methods to motivate themselves and remain persistent. Additionally, they made recordings about their learning process and monitored the production and comprehension in the process. *Self-evaluation* and *self-reaction* were identified in the *self-reflection phase*. Participants evaluated their performance by using their final grades. And they made suggestions and concluded the difficult parts and successful self-directed learning requirements when reflecting on the whole learning process.

A number of implications can be drawn. Theoretically, this study proposed a framework for the self-directed language learning process, which comprised *learning task initiation, forethought, performance,* and *self-reflection phases*. It could help self-directed learners and other agents to inspect the learning process and identify areas of improvement, thus better optimizing the self-directed learning experience. Practically, self-directed learners could proactively seek help from teachers, peers, or friends when facing challenges, as identified by the participants in this study. These agents, in turn, are encouraged to render particular cognitive or emotional support to self-directed learners whenever possible. Furthermore, since the affective states of learners influence their motivation and persistence in self-directed learning (Shen, 2021; Dewaele, 2022), software developers should incorporate the affective monitoring and intervention features in language learning apps to assist learners in countering negative emotions and sustaining their motivation and engagement throughout the self-directed learning process.