USING COGNITIVE STRATEGIES IN MOBILE-ASSISTED LANGUAGE LEARNING TO ENHANCE LISTENING ABILITY AMONG EFL LEARNERS

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Abstract:

The advent of Mobile-Assisted Language Learning (MALL) has revolutionized the field of English as a Foreign Language (EFL) education by providing learners with unprecedented access to language learning resources anytime and anywhere. Among the various skills in language acquisition, listening is often considered one of the most challenging to master. Therefore, it is important to implement effective strategies to enhance listening comprehension. This study examined the role of cognitive strategies in enhancing EFL listening abilities among learners by using MALL, with the aim to investigate what cognitive strategies students used during their listening practice with the MALL method. The qualitative research method was adopted and the students' listening journals were collected and analyzed by using the thematic analysis to conduct the research. Results of the study indicated that meta-cognitive, cognitive, and social-affective strategies were used in students' listening practice. Some other useful points were also found to guide the future MALL research in EFL listening practice. The findings are expected to provide insights for effectively incorporating cognitive strategies with MALL method in EFL listening studies so as to improve listening efficiency and inform instructional practices in the EFL classroom.

Keywords:

Cognitive Strategies, English as a Foreign Language (EFL), Listening Ability, Mobile-Assisted Language Learning (MALL)

Introduction

Listening comprehension is widely considered one of the most difficult skills for learners of English as a Foreign Language (EFL) to master. This challenge arises because processing spoken language requires the quick decoding of various elements, including sounds, words, grammar, and meaning (Vandergrift & Goh, 2012). Moreover, listening itself is a complex process that involves several stages. To achieve full comprehension, learners must progress through three main phases: receiving the message, understanding it, and responding to both verbal and nonverbal cues (Tinh et al., 2024). Except for the intrinsic complexity and difficulty of listening itself, EFL learners have to work on their listening skills alone, without receiving sufficient listening strategies training from their teachers (Goh, 2017; Kök, 2018). In essence, successfully listening comprehension requires not only strong linguistic knowledge such as certain amount vocabulary and cross-cultural knowledge (Hossein & Esmat, 2023) but also well-developed cognitive abilities such as sufficient capacity of working memory and listening strategies (Tinh et al., 2024; Cross, 2018; Siegel, 2014; Tanewong, 2019; Wallace, 2020; Dalman & Plonsky, 2022).

To address these challenges, many educators and researchers have turned to Mobile-Assisted Language Learning (MALL) and proved that MALL was a viable solution. Since MALL leverages the ubiquity and flexibility of mobile devices to provide learners with multimedia resources, more dynamic and diverse contexts to conduct extensive and varied listening practice outside the constraints of the traditional classroom can be implemented (Pegrum, 2014; Stockwell, 2013b), which has effectively improved the listeners' ability (Botero et al., 2019; Xiong & Hiew, 2024). In addition, previous studies also proved that cognitive strategies are indispensable for developing listening proficiency (Ahmadi & Motaghi, 2024). Awinindia (2023) asserts that the development of a strategy is crucial in the teaching of listening as it empowers students to manage and assess their understanding and reactions to auditory information. Students may enhance their ability to manage and assess their information more efficiently by formulating a strategic approach. Therefore, teachers are encouraged to aid students with certain cognitive strategies to improve EFL learners' listening ability. Consistent with Goh's (2000) perspective, instructors should prioritize enhancing students' comprehension of syntax, pronunciation, and vocabulary prior to instructing them in listening skills. The mental processes in cognitive strategies help learners to understand, learn, and retain new information more effectively.

Previous researches have indicated that the MALL method and cognitive strategies both play a crucial role in enhancing learners' listening proficiency, and they can complement each other to improve listening skills. Mobile applications often incorporate features that support cognitive strategies such as summarization, prediction, inferencing, elaboration, and association, which aid learners in processing and understanding spoken language more effectively (Azar & Nasiri, 2021). Additionally, integrating cognitive strategies with the MALL method not only promotes self-regulated learning-enabling learners to set personal goals, monitor progress, and adjust their strategies-but also increases motivation and engagement, leading to more sustained and effective learning outcomes (Wang, 2022). However, what cognitive strategies students usually adopt and perceive as useful in the MALL context during their EFL listening practice is the research goal of this study. Therefore, the study seeks to uncover the most effective strategies for guiding learners in improving their listening skills by using MALL method. To achieve this objective, a qualitative research approach was employed, gathering data from students' listening journals

and analyzing it through thematic analysis. The research question guiding this study is: What cognitive strategies do students adopt during their listening practice with the MALL method?

Literature Review

In order to investigate what cognitive strategies students used during their listening practice with the MALL method, in this part, some previous studies about MALL in EFL listening skills as well as cognitive strategies in EFL listening learning integrated with MALL were discussed, which aimed to find out the gap between previous studies and this one on cognitive strategies used in listening teaching in MALL context.

Overview of MALL in EFL Listening Skills

In recent decades, advancements in communication and information technologies have made digital media an essential part of daily life, such as platforms for broadcasting digitized content through screens or speakers for communication, entertainment, or information sharing (Hoehe & Thibaut, 2022). The widespread use of digital technologies, including tools like the Internet and smartphones for generating, storing, and processing data, has had a profound impact on individuals and societies (Karakose et al., 2022), as well as on language learning. Mobile devices are the preferred media choice for learners in this digital era, and their massive worldwide use has driven a new generation of software called mobile applications or apps for use in the educational context (Papadakis & Kalogiannakis, 2020). MALL method is one of the products of this digital era and mobile device use.

The history of MALL traces back to 1972 with Alan Kay's concept of the 'Dynabook,' evolving through significant technological advancements including PDAs and early multimedia devices such as MP3 and DVD players, and leading to the contemporary use of smartphones that integrate multiple functions for language learning. The development of MALL highlights the transition from behaviorist methods in language laboratories to sophisticated, portable, and multifunctional devices carried any time anywhere, significantly enhancing language teaching and learning (Hadi, 2020; Al-Kadi, 2018). Recent research continues to explore the effectiveness and applications of these technologies in educational contexts and in EFL language learning (Kukulska-Hulme & Shield, 2008; Viberg & Grönlund, 2012; Hasan & Shafiqul Islam, 2020).

MALL has revolutionized language education by leveraging the unique capabilities of mobile devices, such as portability, connectivity, and multimedia functionalities, to enhance the learning experience. MALL facilitates the practice of language skills in a flexible, personalized, and contextually relevant manner, allowing learners to engage with language learning at their own pace and convenience (Stockwell, 2013a).

MALL's impact on EFL listening teaching is particularly notable. The incorporation of mobile technology provides learners with continuous access to a diverse array of authentic language materials and interactive practice opportunities, which are crucial for developing listening skills (Stockwell, 2013b). By using mobile devices, learners can engage in listening activities that range from basic vocabulary acquisition to complex comprehension tasks, all within real-world contexts that enhance the relevance and applicability of their learning. Recent research underscores the effectiveness of MALL in improving listening proficiency. For example, a study by Kwon and Kim (2020) showed that EFL learners who regularly used MALL applications for listening practice exhibited significant improvements in their listening comprehension scores compared to a control group. This improvement is attributed

to the continuous, context-rich, and interactive nature of the mobile learning environment. Studies have demonstrated that MALL significantly boosts learner motivation and engagement. Liu et al. (2019) found that EFL learners who used mobile applications for listening practice reported higher levels of motivation and enjoyment compared to those who relied solely on traditional methods. This increased engagement is attributed to the interactive and multimedia-rich nature of MALL, which caters to diverse learning preferences and styles.

Cognitive Strategies in EFL Listening Learning Integrated With MALL

Defined by Vandergrift and Goh (2012), listening strategies are "conscious and goal directed behaviors, cognitive and social in nature, which learners use to assist their comprehension and learning" (p. 91). A lack of awareness and understanding of listening strategies often leads to inefficiency in coordinating cognitive processes during listening (Awinindia, 2023; Dizon, 2016). Effective listening comprehension can be supported by activities such as listening while reading, repeated listening, interactive listening, and using non-linguistic or semi-linguistic aids (Namaziandost et al., 2009). These activities inherently incorporate listening strategies, which are crucial for language acquisition, as they enhance learners' ability to process, understand, and retain new information. Although various listening strategies and classifications have been proposed, most researchers and practitioners adhere to O'Malley and Chamot's (1990) taxonomy of cognitive, meta-cognitive, and socio-affective strategies. According to these classifications, cognitive strategies are defined as tools for problem-solving that involve mental processes like note-taking, paraphrasing, and translation to analyze and transform listening materials; meta-cognitive strategies are described as the awareness and regulation of one's cognitive processes, including planning, monitoring, and evaluating to improve listening tasks as mental activities involved in developing an awareness of what needs to be done to accomplish a listening task; socio-affective strategies are noted as involve interactions with others, such as asking for clarification and cooperating during listening activities (Ahmadi & Motaghi, 2024; Dalman & Plonsky, 2022).

Goh and Zhang (2013) compared accepted theories for metacognition in listening and reading and concluded that second language (L2) listeners encounter many constraints due to fleeting nature of spoken inputs. Therefore, they need to acquire selected attention strategies more than L2 readers. Dalman and Plonsky (2022) through a meta-analysis, synthesized the results of quantitative research on this realm and determined overall effectiveness of strategy-based instruction on L2 listening. They asserted that strategy-based instruction may not be befitting for all the learners and should be considered cautiously.

In the EFL listening context, cognitive strategies like summarization, prediction, inferencing, and elaboration hold distinct significance. Summarization involves condensing main ideas, helping retain key points from listening materials (O'Malley & Chamot, 1990). Prediction prepares learners by anticipating content based on context and prior knowledge. Inferencing involves deducing meaning from linguistic and contextual clues, while elaboration connects new information with existing knowledge (Oxford, 2018). According to Rost (2014), these cognitive strategies are essential for developing listening proficiency, as they enable learners to actively engage with and interpret auditory information.

Meta-cognitive strategies, unlike cognitive strategies, are crucial for setting listening goals, monitoring comprehension, and adjusting strategies as needed (Vandergrift & Goh, 2012). These strategies, such as self-regulation, self-assessment, and reflection on listening

performance, enhance learners' awareness of their listening processes and promote autonomy. Additionally, social-affective strategies, including collaborative listening activities, peer feedback, and seeking clarification, provide essential opportunities for practice, feedback, and support, thereby improving listening comprehension and creating a positive learning environment. Gkonou and Mercer (2017) emphasize that social interaction and emotional support are critical in language learning, as they help maintain motivation and reduce anxiety, which significantly contributes to the development of listening skills by fostering a supportive and interactive learning atmosphere (Vandergrift & Tafaghodtari, 2010).

Although research on the effects of cognitive strategy scaffolding on EFL listening improvement is limited, several studies have explored related aspects. Vellanki et al. (2022) examined the impact of prediction and reflection meta-cognitive strategies at a university in Oman, finding that these strategies enhanced learners' understanding of listening processes, emphasized the importance of prediction, and highlighted the benefits of collaboration and motivation in meta-cognitive activities. Building on Vellanki's work, Wang (2015) applied a meta-cognitive pedagogical cycle to Chinese university EFL learners, demonstrating improvements in listening proficiency and meta-cognitive knowledge. Wang concluded that integrating meta-cognitive, cognitive, and socio-affective processes fosters self-regulated learning in listening instruction.

The studies by Read and Barcena (2016), Dimassi (2016), and Zeng and Goh (2018) collectively highlight the effectiveness of meta-cognitive strategies in enhancing EFL listening comprehension. Read and Barcena (2016) demonstrated that a social mobile-assisted listening application, Audio News Trainer (ANT), improved learners' meta-cognition, listening strategies, and comprehension of news recordings. Dimassi (2016) compared cognitive strategy-based instruction (CSBM) with meta-cognitive strategy-based instruction (MetSBM), finding that MetSBM was more effective in improving listening comprehension. Zeng and Goh (2018) explored the impact of a self-regulated learning approach on extensive listening, concluding that well-designed meta-cognitive tools can help learners autonomously prepare for, monitor, and evaluate listening tasks. All in all, reviewed studies reported positive effects of understanding and applying listening strategies on listening comprehension performance. But, in real MALL context listening practice, what specific strategies students use most has relatively few research.

The Combination of Technology-Enhanced L2 Listening Development (TELD) Model with the Cognitive System
The theoretical framework underpinning this study is anchored in a Technology-Enhanced L2 Listening Development (TELD) Model which was adopted from Zhang et al. (2023). Technology-Enhanced Language Learning (TELL), and specifically TELD, has its origins and evolution closely tied to advancements in both language learning theories and technological innovations. It has evolved from simple early audio recordings in Audiolingual Method in 1950s-1960s in language labs to the later more advanced technology, such as video cassettes and later CD-ROMs. Later, Computer-Assisted Language Learning (CALL) in 1970s-1990s started to play a role in providing authentic listening materials. Today's teaching theory is integrated with internet technology that produces new learning models, such as Mobile-learning (ML), Mobile-Assisted Language Learning (MALL), Artificial Intelligence (AI), Adaptive Learning (AL) ,Virtual Reality (VR) and Augmented Reality(AR), which provide sophisticated, personalized, and immersive learning experiences facilitated by

the modern and advanced technologies. The continuous innovation in technology promises further enhancements in the ways learners develop their listening skills, making language learning more effective and engaging. Therefore, it can be said that the TELD model and theory have a long history in facilitating EFL listening. In this study, the TELD model (Figure 1) is created by combining the general TELD framework with Winne and Hadwin's (1998) self-regulated learning model. This integrated model is distinct from others in that it consists of two parts: within and outside of learners' cognitive systems. The model aims to provide a comprehensive approach to EFL listening development, leveraging both technological advancements and cognitive strategies.

Results from previous studies showed that TELD allows learners to select listening materials from rich resources based on their individual needs and preferences (Hsieh & Huang, 2020). They could also actively engage in different learning tasks in TELD with high levels of control (Kato et al., 2016) and perform various self-regulated learning strategies (Zhang & Zou, 2022), such as reflecting on listening processes (Wu & Wang, 2021) and adjusting the content and pace of their listening practice (Bozorgian & Shamsi, 2022). This model is in line with the concept of MALL method applied in EFL listening development in this study.
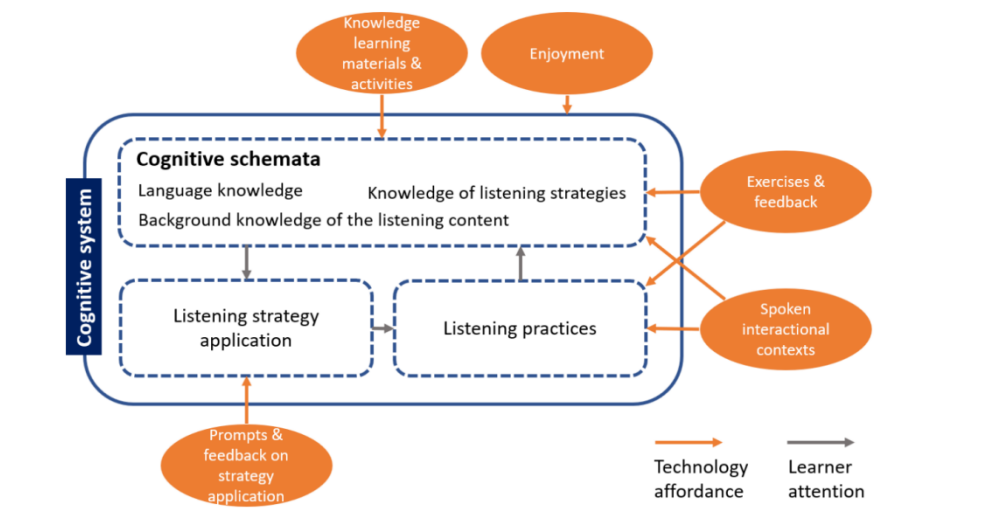

Figure 1: TELD Model

Source: Zhang et al. (2023)

Methodology

Research Design

This study employed a qualitative research method by gathering data from students' listening journals over a six-week period in their EFL listening class. MALL was integrated into their listening practice to address the limitations of in-class listening instruction such as time constraints (only two hours per week under the teacher's guidance) and a teacher-centered approach whereby teachers control the listening content and pace that require all students to listen to the same material at the same speed simultaneously.

Under the MALL method, students were instructed to engage with online listening materials via their mobile phones after class. This approach allowed students the freedom to choose listening content based on their proficiency levels and personal preferences. Additionally,

students were required to maintain listening journals, documenting their notes on listening content, reflections, and perceptions of the MALL method applied in their practice. After the six-week experimental period, the students' listening journals were collected for analysis to explore their cognitive strategies.

Research Setting

This research was conducted at Xi'an University in Shaanxi Province, China, which is a comprehensive institution comprising 15 colleges and offering 50 majors in arts and sciences. The study took place at the School of Foreign Studies, focusing on students majoring in English Translation and Interpretation.

Participants

The study participants were 22 undergraduate students majoring in English Translation and Interpretation. All the participants were native Mandarin speakers with approximately six years of EFL education in high school. The students, aged 19-20, were sophomores in their first semester of the second year. English listening was a compulsory course, with two hours of in-class instruction per week. Consent for the study was obtained from the School of Foreign Studies at the author's university. The participants were conveniently sampled from three classes taught by the researcher (Xiong). These classes were chosen due to the researcher's frequent contact with the students, facilitating instruction and data collection.

Research Instrument

This study employed students' listening journals as the primary instrument for obtaining qualitative data. Guided by the MALL method, the learners conducted their listening practice using their mobile phones. Concurrently, they maintained a listening journal for each practice session. At the conclusion of the six-week experimental period, these listening journals were collected for comprehensive analysis.

Procedures

This study investigated the cognitive strategies applied in enhancing EFL listening ability by integrating the MALL method with students' listening practice. To obtain the qualitative data, the learners were required to engage in after-class listening practice using the MALL method. This involved utilizing online resources via their mobile phones, selecting news or other online content based on their proficiency and preferences, and conducting listening practice as part of their daily homework. During their listening practice, students were instructed to maintain a listening journal for each session. The journal contents included notes on the listening materials, new vocabulary encountered, and other significant or useful points beneficial for their English learning. Additionally, at the end of each week, students wrote reflections on their listening process and their perceptions of the MALL method.

At the beginning of each subsequent week's listening class, the teacher reviewed each student's listening journal individually, circulating around the class to verify that the practice had been completed. Students who had not completed the practice received oral reminders and warnings. Additionally, three to four students were selected each week to share their listening content by reading or retelling it aloud in front of the class. After six weeks, the researcher collected the students' listening journals for a comprehensive content and thematic analysis.

Data Analysis

The qualitative data from the students' listening journals were analyzed using a thematic analysis procedure. Following Braun and Clarke's (2006) guidelines for thematic analysis, the process began with familiarizing the data. The researchers then generated initial codes, defined by Boyatzis (1998, p. 63) as "the most basic segment, or element, of the raw data or information that can be assessed in a meaningful way regarding the phenomenon." In this study, the codes were extracts from the students' listening journals relevant to their listening content and perceptions of the MALL method applied to their listening practice.

Subsequently, the different codes were sorted into potential themes, a process involving grouping codes into more meaningful and analytic units (Miles et al., 2014). These potential themes underwent further refinement, with some themes being merged and others separated to enhance clarity and relevance. Ultimately, the themes were clearly defined and presented for comprehensive analysis, encompassing both thematic and cognitive dimensions.

Results and Findings

The researchers selected nine listening journals from the study group of 22 students for thematic analysis to identify emerging themes. Although the teacher instructed all students to maintain weekly listening journals, not all complied. While some students consistently completed detailed entries throughout the six-week practice, others approached the task superficially, writing only brief notes and treating it as a burden. As a result, many journals lacked sufficient information and contained little valuable content for analysis. Only nine journals met the criteria for consistent, detailed, and thoughtful entries, containing notes of listening content and reflections for each week listening practice. These journals were subsequently coded to identify emerging themes. Ultimately, four prominent themes were identified:

Theme 1: Employing Cognitive Activities During Students' Listening Practice

Students were able to complete their daily listening tasks by listening to news or contents appropriate to their proficiency and preferences. During each session, they took notes, recorded difficult points and new vocabulary, and translated long and complex sentences by referring to related documents, looking up the words in the dictionary to enhance their understanding. Additionally, students tended to focus more on individual learning rather than collaborative efforts.

> By listening to the news and other listening materials, I **took notes, wrote down the new words and useful sentences**, then I got the chance to acquire many new words. Although they are totally new at the beginning, after I **looked up in the dictionary** and **met these words again and again** during the constant listening practice, I **finally remembered these words** and knew how to use them accurately in the real context. For the long and complicated sentences, I tried to **translate** and understand the content better. (Student 4)

> This is the fourth week of my continuous practice, I found I can understand the **main content of the news** now. I can follow the speed better than former weeks. The reason may be related to the **contents** which I selected are **easier** than the previous weeks. I chose shorter and easier news and listen to them repeatedly, **took notes and wrote down the new words and main idea**. I **formed my own**

habit to practice my listening although it seems slow **compared with others**, I found my listening ability improved. This method is suitable for me. (Student 1)

Theme 2: Employing Meta-Cognitive Strategies During Students' Listening Practice

Students' reflections on the MALL method in their listening practice indicated that they initially struggled with authentic materials or international news due to unfamiliar background knowledge and new vocabulary. Consequently, they adjusted their learning content to more familiar or preferred topics, progressing from easier to more challenging materials. Over time, they observed improvements in their listening abilities. For particularly important or difficult passages, they employed strategies such as slowing down the playback speed or listening repeatedly until they could clearly understand the content.

> There are so many new words and new information, also the speed is so high that I cannot catch the words and the meaning of the passage during my listening practice, then **I tried to slow down and speed** and **play the materials again and again** until I understand the meaning. (Student 3)

> I found it is difficult to understand the international news at the beginning weeks because of unfamiliar background and new words, then I **adjust the contents,** speed, and difficulty of the listening materials. I chose to listen to **"Hello, China" serials**, the result is better because I **have some familiar background information.** (Student 9)

Theme 3: Primary Hindrance to Students' Listening Comprehension

Analysis of students' journal reflections revealed that nearly all students identified unfamiliar vocabulary as a significant issue. During their listening activities, many students encountered numerous new words and lack of cross-field knowledge or background information that impeded their understanding of the listening materials.

> I have found that MALL method provided many available listening materials, but they are with **quite high-speed**, **dense with content**, and **packed with new information**. As a result, much of the content is difficult to comprehend due to the **high frequency of unfamiliar vocabulary** and **complex sentences**, making it quite challenging. (Student 6)

> I met many **unfamiliar topics** during my listening practice, especially by listening the **current news events**. Without understanding **the background** of these news stories, I often encounter many **difficulties in proper terms**, including **names of people, places, or events**, which are unfamiliar to me in English and significantly hindered my comprehension. Therefore, it is important to regularly stay updated on domestic and international news to keep pace with societal developments and to build background knowledge that supports listening comprehension. In the information age, where society is rapidly evolving, keeping up with the latest information is invaluable. （Student 14）

Theme 4: Self-Paced Listening Practice

The incorporation of mobile technology provides learners with continuous access to a diverse array of authentic language materials and interactive practice opportunities, which are crucial

for developing listening skills. By using mobile devices, learners can engage in listening activities that range from basic vocabulary acquisition to complex comprehension tasks, all within real-world contexts that enhance the relevance and applicability of their learning.

> After several weeks of practice, I found my listening ability has improved. I think the reason may be **related to the contents which I selected are easier than the previous weeks**. I needed to **adjust the contents and method** for my listening practice, such as **find some easier materials according to my own ability.** (Student 1)

> After a few weeks of practice, I found **international news is difficult**. I realized I need to adjust the listening content and methods in time. If the material is too difficult or uninteresting, it can be frustrating and ineffective. I chose to **watch English movies**, especially **animated films I am familiar with**, and **watched** them **repeatedly** while trying to mimic the dialogues. This way, I learned a lot of new vocabulary and expressions, and I feel that my listening skills have improved quickly. My ears have also become more sensitive to many words, and the results are very good.(Student 5)

Discussion

The findings of the research answered the research question "What cognitive strategies do students adopt during their listening practice with the MALL method?". The results showed that cognitive strategies and meta-cognitive strategies were used most in students' listening practice in the MALL context, while socio-affective strategies were employed least in this research.

In terms of cognitive strategies, the findings of this study revealed that cognitive activities such as note-taking, identifying main ideas, and translation were mostly used in the EFL listening practice integrated with MALL. These results are in line with previous scholars' research findings. Garcia and Asencion (2001) reported that scaffolding note-taking strategy through sharing notes in small groups improved learners' listening comprehension development. Tinh et al. (2024) also mentioned that cognitive methods are used by individuals to integrate, store, and recall recently acquired knowledge. In the context of cognitive listening strategies, two primary approaches are employed: top-down and bottom-up listening strategies (Furuya, 2021). Bottom-up techniques include word-for-word translation, repeated oral readings, focusing on the speaker's vocal intonation, and closely examining textual features. On the other hand, advanced techniques encompass logical reasoning, data visualization, predictive modeling, and informed approximations. Studies by Abdalhamid (2012), O'Malley et al. (1989) and Conrad (1989) concluded that advanced learners tend to use top-down methods more frequently than beginners.

Additionally, in the aspect of meta-cognitive strategies, such as monitoring, evaluation, and reflection activities were used to facilitate students' listening practice. The results of this research are in accordance with Wang's (2015) study that incorporated a meta-cognitive approach in listening instruction to Chinese university EFL learners and verified that the pedagogical cycle had a positive effect on EFL learners' listening proficiency and meta-cognitive knowledge. Wang concluded that the meta-cognitive, cognitive, and socio-affective processes help language learners develop self-regulated learning. In the present study, learners adopted self-regulating strategy by adjusting their listening content from familiar one

to new scope, slowing down the speed, repeatedly listening to the same content and reading the manuscript of the listening materials, selecting practice materials from easier to difficult ones, and arranging their own learning pace. These actions are consciously and unconsciously guided by the meta-cognitive strategies. The findings in Read and Barcena's (2016) study on meta-cognitive strategies also verified the students' meta-cognition development, improved use of listening strategies, and enhanced ability to comprehend the news recordings heard are scoffed by meta-cognitive strategies. In addition, Ahmadi Safa & Motaghi (2024) discussed cognitive vs. meta-cognitive scaffolding strategies and EFL learners' listening comprehension development. Their findings showed that both strategies play effective roles for learners' listening improvement. Additionally, MALL promotes self-regulated learning by allowing learners to set personal goals, monitor their progress, and adjust their learning strategies accordingly.

Socio-affective strategies involve students working collaboratively with others and managing their emotions. Although several previous studies proved that socio-affective strategies were beneficial for verifying learners' understanding and reducing their anxiety (Dang et al., 2021), and practicing with friends encourages students to deepen their understanding of English and provide mutual feedback on mistakes (Awinindia, 2023). In contrast to this study, the students focused on individual learning with limited opportunities for collaboration when applying the MALL method in their listening activity. The students only have the chance to communicate with each other at the beginning of each class, thus the time and chance are limited. Consequently, many students repeatedly made the same mistakes due to a lack of communication.

In addition, the findings in this research showed learners' vocabulary problem was a major hinder for students' listening comprehension. This result is in line with many previous studies that indicated EFL learners are constantly frustrated by their inability to recognize words when listening to a native speaker, even when they have already learned the words (Jia & Hew, 2019). As Charles and Trenkic (2015, p. 2) put it, "Speakers of English as a foreign language often find it difficult to identify which words are present in the continuous stream of speech produced by native speakers; this happens even when all individual words are familiar to them". Such pervasive decoding problems were empirically confirmed by Kuo (2010) and remain a major issue in second language listening research and pedagogy (Field, 2003, 2008). Therefore, strategies for solving learners' problem with new words in EFL listening is crucial to improve their listening skills. The cognitive process of listening also proved that lexical problems are the basic foundation for listening. The top-down and bottom-up processing categories also pointed out that when listeners comprehend speaker's meaning, they construct meaning by assembling increasingly large linguistic units, beginning at the auditory-phonetic, phonemic, and syllabic levels and moving up to the lexical, syntactic, semantic, propositional, pragmatic, and interpretive levels (Field, 2003). Anderson's (2005) three-stage model of listening comprehension includes perception, parsing and utilization three levels, which also pointed out that the first stage of listening is that listeners encode speech. This means encoding is the initial and the first step for conducting listening process. In addition, Field (2013) proposed lower-level and higher-level listening processes model. In his model, he classified Anderson's stages of perception and parsing , input decoding, lexical search and parsing as the lower-level stage; higher-level processes involve meaning construction and discourse construction. All of these three models showed that lexical and encoding issues are

the basic stage for listening comprehension. The comparison between the three frameworks of the cognitive process of listening comprehension is illustrated in Figure 2.
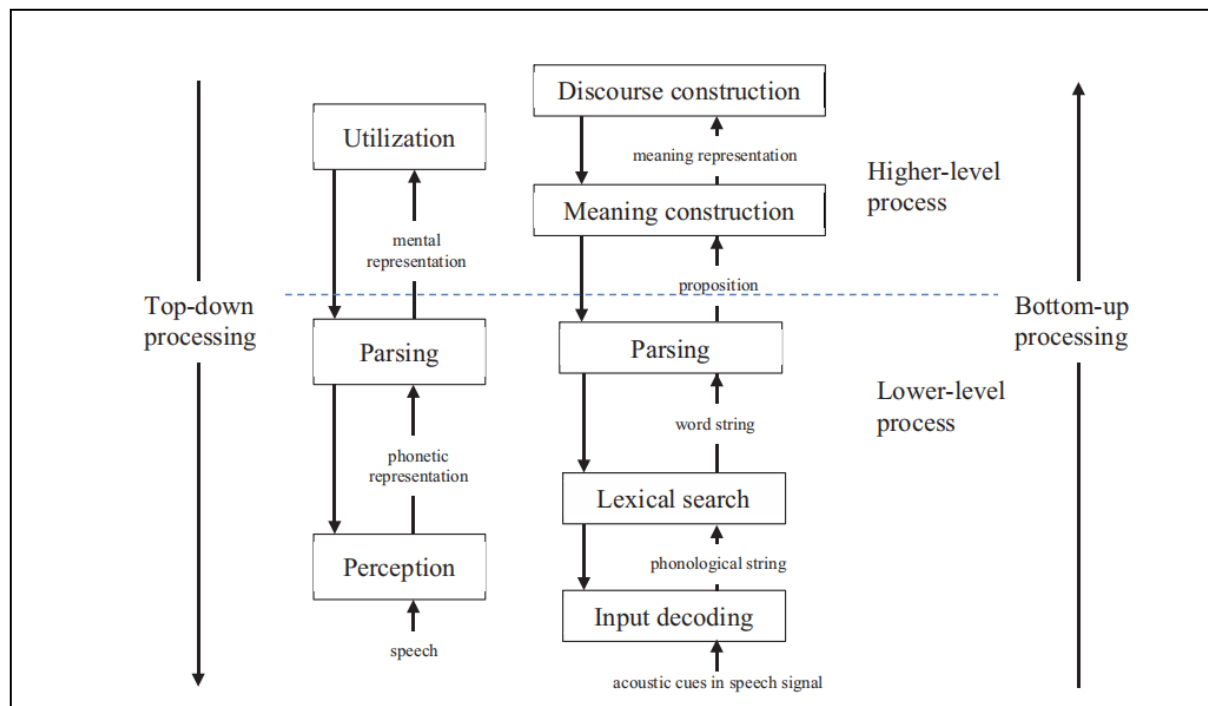

Figure 2: A Comparison Between Three Frameworks of the Cognitive Process of Listening Comprehension
Source: Jia & Hew (2019)

All these studies proved that lower-level (input decoding & lexical search) listening process is important because "many high-level breakdowns of communication originate in low-level errors" (Field, 2003, p. 325). This error, although minor, may result in confusion or even failure to comprehend the text as a whole. In addition, the decoding skills required for lower-level processes are new and more challenging for EFL learners compared with their higher-level processing skills that they have acquired in their native language (Swan & Walter, 2017). Research on L2 reading has also demonstrated that learners' deficient decoding abilities (i.e. lower-level processing) limit the transfer of higher-level process skills from L1 to L2 (Walter, 2007). Therefore, when learners are trained to decode lower-level information in a more automatic, fluent, and effortless way, attention is saved for higher-level processes (Field, 2008).

Conclusion
The findings of this study showed that cognitive, meta-cognitive, and socio-affective strategies were adopted in EFL learners' listening practice in the MALL context. Note-taking, identifying main ideas, and translation were the most frequently employed cognitive activities in their listening practice. Learners use mobile tools to plan, monitor, and evaluate their listening activities, thus enhancing their meta-cognitive awareness and self-regulation skills. Compared with the other two strategies, socio-affective strategies were used less in this study. In addition, focusing more on learners' lower-level listening process such as expanding learners' vocabulary is important for their listening development.

This study offers several important implications. First, EFL learners can effectively use cognitive strategies to enhance their listening comprehension. Second, it underscores the value for EFL listening instructors in integrating cognitive strategies with the benefits of the MALL method. However, the study has its limitations. The research relied solely on qualitative analysis of the listening journals, which may not fully ensure the robustness of the findings. Additionally, the study did not fully explore the benefits of socio-affective strategies which are important to improve the learning efficiency in MALL context. Future research should consider incorporating collaborative learning in EFL listening classes within the MALL context. Teachers should also focus on expanding learners' vocabulary, providing scientific evaluations of listening outcomes, and improving listening skills to offer a more comprehensive approach to EFL listening development.

Acknowledgement

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