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ATTENTIONAL DISTRACTION IN APP-BASED LANGUAGE LEARNING WITH MOBILE PHONES: A LITERATURE REVIEW

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Abstract

This research reviews attentional distraction factors in mobile phone-based language learning and proposes the Interactive Model of Attentional Distraction Management in learning as a new theoretical framework. Distractions from multitasking, notifications and social media apps were shown to reduce attention as well as memory function, hindering important cognitive processes in language acquisition. Individual factors such as age, gender and experience also affect the ability to manage distractions, which reinforces the urgency of adaptive attentional management. This new theoretical framework offers an interactive and personalised solution with three main components: cognitive, psychological and social environmental elements. Mobile phone-based applications can adjust learning settings in real-time, providing better user control over distractions. This model is expected to improve learners' focus, maintain attention, and support the effectiveness of technology-based language learning.
Keywords: attentional distraction, language learning, cognitive, adaptive management

I. INTRODUCTION

Today, it is nearly impossible for anyone to ignore the involvement of mobile phones, as they are expected to remain constantly active (Moreira et al., 2017), Mobile technology is regarded as versatile computing, providing services across various fields, including education (Persson & Nouri, 2018). The integration of mobile technology with learning is a new issue in language acquisition. A comprehensive exploration of smartphone-based language learning reveals that the role of smartphones in education comes with both strengths and weaknesses. The phenomenon of attention distraction in language learning has become crucial to examine more deeply in order to understand the limitations within the learning process. One important area of study highlights that mobile phone usage reduces attention and affects memory function during lectures, and distractions from text messages disrupt learning (Mendoza et al., 2018).

Some key requirements supporting this paradigm shift in language learning include mobile- based language learning, which promotes student autonomy and enables them to tailor their learning according to their pace, preferences, and proficiency level. Mobile-based language learning also facilitates contextual and in-depth learning by immersing students in authentic language contexts and real-world situations (Zawacki-Richter et al., 2006).

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The advantages of using smartphones do not rule out the challenges in the learning process that require deeper exploration. The uneven development of the four language skills can be an intriguing topic for further investigation into smartphone-based learning (Metruk, 2022). Issues such as digital literacy, technological accessibility, and distractions present significant obstacles for both learners and educators. Additionally, the abundance of language-learning apps available in app stores calls for critical evaluation and discernment to distinguish between effective and ineffective, as well as integrative and disintegrative, resources (Nghi & Nguyen Tat, 2024).

The process of language acquisition relies on a complex interaction between cognitive processes and attentional focus. Attentional focus assists learners in processing information, internalizing language structures, and selectively attending to language input. The role of attention in language acquisition emphasizes the capacity of the attentional system to process language input. This indicates that the capacity of the attentional system can affect the speed and depth of language learning (de Diego-Balaguer et al., 2016). Modifying internal and external attention, such as through structured input practices and enhanced textual input, has been shown to influence learners' attention allocation to specific forms and facilitate second language acquisition (Issa & Morgan-Short, 2019).

The presence of smartphones can reduce baseline attentional performance, even when the devices are turned off (Skowronek et al., 2023). The use of smartphones in learning presents a double-edged sword, as they can divert students' attention due to accumulating notifications, alerts, and push notifications from various apps, which disrupt students' attentional focus, hinder information processing, and affect learning outcomes (Banan, 2020). The expansion of smartphone use by offering access to entertainment, information, and social interaction, along with their constant presence, can bring both benefits and negative impacts on attention itself.

Mobile-based language learning is becoming increasingly complex due to individual differences in susceptibility to attentional distractions (Skowronek et al., 2023). Students' vulnerability to distraction and their ability to regulate concentration are influenced by variables such as personality traits, cognitive control abilities, and prior smartphone usage habits (Unsworth & McMillan, 2017). Susceptibility to distraction may also be affected by previous phone usage habits, such as addiction and overuse (Ward et al., 2017). Therefore, it is essential to control the attention of smartphone users—

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particularly students—to mitigate negative consequences and reduce declines in psychological well-being (Chu et al., 2021).

This study aims to elucidate the complex relationship between attentional focus, distraction, and mobile-based language learning. By integrating recent empirical research, theoretical frameworks, and practical perspectives, this study seeks to enhance understanding of attention dynamics in language acquisition and to provide insights into pedagogical methods and their connection to technological interventions.

The specific objectives of this literature review are as follows: first, to critically and thoroughly evaluate recent empirical studies and investigate the relationship between learners' attention and mobile-based language learning outcomes. Second, to examine attentional disruptions—particularly from notifications across various applications—and their effects on cognition, engagement, and learners' performance in language learning (Hamim & Hikmah, 2022). Third, to elaborate on the conceptual theoretical framework explaining attention in language acquisition within the context of technology-mediated learning. Fourth, to identify practical models and strategies to reduce attentional distractions and promote effective attention control in mobile-based language learning. Fifth, to recommend potential alternative designs and optimal implementations for mobile-based language learning applications.

II. METHOD

This research employs a literature review approach to understand and explain the phenomenon of attentional distraction in mobile application-based language learning. A literature review is a study that analyzes and synthesizes the existing body of literature by identifying, examining, and tracing the framework of various theories through the evaluation of prior work (Kraus et al., 2022). The literature review in this study includes the review design, inclusion criteria, exclusion criteria, search methods, and selection process for the review.

Review Design

This reseach will employ a Review Design approach, utilizing analysis and synthesis from various relevant literature sources and studies.

Inclusion Criteria

The literature sources included in this review must meet the following criteria:

1. Related to the phenomenon of attentional distraction in mobile application-based language learning.
2. Research sources or literature published in English or in other languages with

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summaries or translations available in English.
3. Research sources or literature that are published and accessible.

Exsclusion Criteria

The literature sources that will not be included in this review are those that do not meet the criteria mentioned above or are not relevant to the research topic.

Search Methods

Literature review will be conducted through several sources, including:

1. Academic databases such as PubMed, Scopus, Google Scholar, and PsycINFO.
2. Digital libraries of universities and related institutions.
3. Relevant books and textbooks.
4. Conferences and journals focusing on studies about attention distraction in mobile-based language learning applications.
5. Search keywords will include terms such as "Attention," "Distraction," "Adaptation Management," "Language Learning," "Digital Influence," and other related terms.

Selection Review

The review selection stage will include the following steps:

1. Identification and collection of all potential literature sources that meet the inclusion criteria.
2. Removal of duplicates from the search results list.
3. Review of titles and abstracts to assess the suitability of studies or literature sources.
4. Full-text evaluation of selected sources to verify relevance and contribution to the research.
5. Integration of findings from the selected literature sources into the research.

III. RESULT AND DISCUSION

Definition of Attention Distraction and Its Impact on Learning

Distraction is something that makes it difficult for a person to think or pay attention. It is the process whereby an individual or group is diverted from a desired area of focus, obstructed, or experiences a decline in desired information (Chu et al., 2021). This view is based on the idea that when someone becomes aware of something different, there is a conflict between attending to a particular object and completing the task at hand (Baron et al., 1978). In the context of education, the term "distraction" specifically refers to the tendency of students to use non-formal applications and websites in addition to formal, standard, or predetermined content (Abdelaziz, 2020).

In the learning process, the duration of attention can vary from sustained concentration to short-term attention due to

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momentary notifications (F. Sun & Ma, 2020). Generally, effective learning strategies will restore attention and refocus concentration on learning.

The Relationship Between Cognitive Linguistics, Language Acquisition, and Attention Distraction Attention and distraction play crucial roles in the success of language learning. Cognitive theory provides a foundation for understanding how attention is distributed and how distraction either hinders or enhances language acquisition. However, according to some researchers, mobile phone features are thought to reduce cognitive load and facilitate task completion in learning (Al- Otaibi et al., 2016), as they offer psychological comfort to mobile users.

Cognitive linguistics serves as the basis for language acquisition, encompassing the mental processes involved in understanding, producing, and acquiring language (Le & Nguyen, 2023). Language production itself is a complex cognitive process (Centeno, 2023), which requires full attention in the learning process.

Attention distraction acts as a barrier for language learners; this distraction diverts cognitive performance away from linguistic stimuli and hinders language encoding and information retrieval, negatively impacting attention-related challenges in mastering language (Chu et al., 2021).

Distraction and delayed allocation of attention are strongly associated with certain learning disabilities (Jones & Warren, 1991). Attention and distraction significantly influence the success of language learning (Hughes et al., 2021), necessitating the involvement of psychological, cognitive, and social factors to control an environment that fully supports language learning (Delbio & Ilankumaran, 2018).

Attention shifts caused by distraction are often natural (Seli et al., 2016). These shifts may also be unintentional, where attention is diverted from the primary focus due to internal distractions, such as concerns or external distractions like noise, among others. Attentional resources fluctuate during language learning tasks, reflecting various interactions between attention and linguistic processes (Mishra, 2009).

Such unintentional attention shifts may be linked to overall levels of alertness and learning motivation, leading to disengagement and boredom, with less attention devoted to active learning engagement (Unsworth & McMillan, 2017).

Types of Attentional Distractions from mobile phones

The mere presence of mobile phones is considered a source of distraction, leading to reduced attention and performance (Thornton

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et al., 2014). The most common distractions in mobile-based learning include social media networks and entertainment applications, web browsing, pop-up message notifications, and incoming calls (Abidin, 2023).

1. Effects of Multitasking

Multitasking with media can divide attention and even shift it away from primary tasks (May & Elder, 2018). The impact of media multitasking on academic performance arises from the use of limited cognitive resources, which prevents a more meaningful learning process (Aivaz & Teodorescu, 2022). This also disrupts memory functions in learning (Tassone et al., 2017), affecting the ability to understand, retain, and organize learning notes (Schmidt, 2020), thereby reducing academic productivity and work performance (Thornton et al., 2014). Interruptions caused by multitasking can slow down, obstruct, inhibit, and largely divert other cognitive processes, pulling them away from the primary goals in the learning process (Gazzaley & Rosen, 2016).

2. Various Types of Notification Sequences from Social Media

A series of notifications from social media platforms, often in the form of messages, can divert students' concentration and decrease their attention on learning content (Ralph et al., 2015). Mobile notifications significantly capture additional attention and can trigger thoughts that are irrelevant to the learning content (Stothart et al., 2015)..

3. Social Media and Its Impact on Learning Distraction

Social media is a collective term for websites and applications used for communication, community, interaction, content sharing, and collaboration (Chanda et al., 2023). Social media interruptions are identified as a primary source of distraction for students during learning (Gupta & Irwin, 2016) compared to other entertainment applications. Addiction to social media fosters attention-related dependency, hindering learning and reducing cognitive performance (Lepp et al., 2015). Other entertainment applications, such as games, serve as an immediate escape during learning sessions (R.-Q. Sun et al., 2023). Additionally, the infiltration of social media and entertainment erodes the learning environment in classrooms, negatively affecting other students (Kuznekoff & Titsworth, 2013).

Factors Related to Attention Distraction in Mobile-Based Learning

Essentially, several issues in mobile-based language learning today are pedagogical rather than technological in nature (Burston, 2014), affecting the achievement of learning objectives.

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Behavioral differences in language learning with mobile technology are influenced by personal factors, gender, and the technological environment itself (Viberg & Grönlund, 2013). Variations in attention control in language acquisition are also shaped by individual cognitive differences (Mora & Darcy, 2023).

Science has shown that men and women exhibit differences in cognitive processing and information handling (Hou, 2019), although these differences are not highly significant in language acquisition within educational contexts (Delic et al., 2018). Many studies indicate that women tend to spend more time on social media than men, often using it as a productive tool, whereas men are more likely to use it for entertainment (Goswami & Dutta, 2015).

Differences in Attention Control in Language Learning

Differences in attention control during language learning are also influenced by age within the context of language acquisition (Kapa & Colombo, 2013). Learning age has a stronger impact on developing speaking skills than on mastering grammar in second language acquisition (Huang, 2014). Additionally, age is a key factor in predicting final achievement in lexical dimensions of spoken second-language vocabulary (Saito, 2024). Other crucial factors influencing second language acquisition include societal context, language access, attitudes toward the language, as well as personal relationships and bonds, such as love and friendships (Oktavia, 2020).

Learners may lose attention, even briefly, for example, a minute or less, often due to fatigue, distractions, or mental drift to other topics (Hlas et al., 2019). Educational background also influences attention in mobile-based learning by affecting students' preferences and behaviors.

Previous linguistic experiences of learners can help address cognitive challenges in verb morphology when learning a second language (Cintrón-Valentín & Ellis, 2016). Teachers from different subjects have varying preferences for utilizing mobile learning features; language teachers often emphasize adaptive content, whereas science teachers prioritize student interaction and inquiry-based learning (Lai & Hwang, 2015).

Considering students' backgrounds is also crucial in the use of virtual environments for online teaching, as it can significantly influence attention, motivation, and empathy. Teachers and students have different motivations in selecting the appropriate virtual environment to foster positive relationships and ensure comfort (Zhou & Zhang, 2020).

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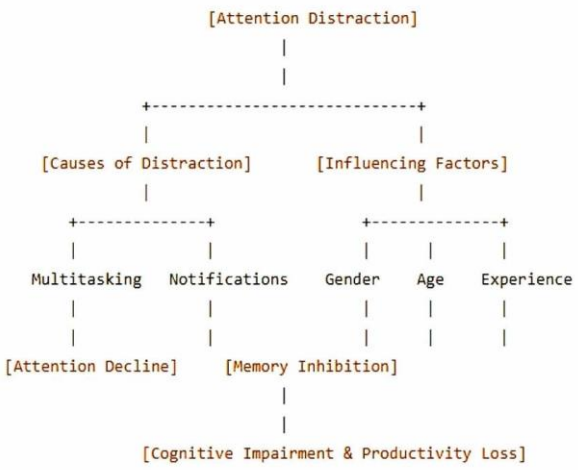
Additionally, students' attention in mobile-based learning classrooms is affected by factors such as time span, task feedback, instructional methods, content format, students' response times, and learner initiative. These factors collectively have a significant impact on engagement and learning outcomes (Ireri & Wario, 2017).

Graphic Of Mind Mapping



The graphical mapping visualization above illustrates attention distraction, its influencing factors, and its impact on cognition and productivity. Attention distraction is triggered by primary causes, namely multitasking and notifications. Multitasking, such as accessing social media while studying, can reduce attention capacity and memory, while notifications from devices divert students' focus away from learning materials. These two factors contribute to a decline in attention, ultimately disrupting the learning process and productivity.

In addition to the causes of distraction, there are factors that influence the level of distraction, including gender, age, and experience. Gender and age can affect how individuals use social media and the extent to which such distractions impact them. Different levels of experience or educational background also influence adaptation to distractions. The impact of these factors is evident in memory inhibition, which hinders effective comprehension of material, resulting in cognitive impairment and decreased academic productivity. In summary, sustained distractions can weaken students' cognitive abilities and academic achievements.

Based on the findings from the literature above, the following are the main elements of a proposed new theoretical framework, namely The Interactive Model for Managing Attention Distraction in Mobile-Based Language Learning. This framework consists of:

1. Cognitive Elements

a. Focused Attention Capacity

This new approach incorporates the management of focused cognitive capacity as a core component. It is based on the understanding that language learning processes require full attention allocation to linguistic input. The framework proposes strategies to build "focused time blocks" specifically designed for language learning,

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interspersed with short breaks to manage attention.

b. Working Memory Management

Given that working memory activated during language learning is often disrupted by multitasking, the framework suggests an approach to manage multitasking by setting a "minimal distraction" mode in learning applications. This mode allows users to minimize interruptions from notifications or access to other applications while an active learning session is in progress.

2. Psychological Element

a. Attention Regulation Based on Personal Preferences

This element considers the psychological aspects of learners, such as interest, motivation, and tendency toward distraction. Personalizing learning applications based on users' cognitive and psychological preferences can help enhance learning effectiveness.

b. Motivation and Self-Control

Focused on developing self-control in mobile phone use, where learners are trained to consciously manage internal distractions. This framework emphasizes the importance of building intrinsic motivation to remain focused on learning by reinforcing specific learning goals.

3. Social Environment Elements

a. Social Control Over Social Media Distraction

Mobile-based language learning applications should consider the management of social interactions. For example, providing social support in the form of virtual study groups can reduce the need to access social media applications that tend to divert attention.

b. User Interaction with the Technological Environment

The technological environment plays a significant role in the effectiveness of language learning. Setting a learning mode in applications that restricts access to entertainment or social media features during learning sessions can create a more conducive learning environment.

Meanwhile, the Interactive Elements in managing distraction within language learning applications are expected to respond to cognitive, psychological, and social factors affecting attention in real-time. Thus, this model emphasizes interactivity in several ways, namely:

1. Real-Time Adjustment

The application can be adapted to individual situations in real-time, such as adjusting notifications or blocking certain features during study periods.

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2. Personal Flexibility

This model allows learning applications to be individually tailored based on psychological preferences and tendencies. For instance, users who are prone to distraction can select a "full focus" feature that restricts access to social media.

3. Social Influence in Language Learning

Adding social elements, such as virtual study groups or notifications from instructors, can help users stay motivated and maintain attention during the learning process.

This interactive approach aims to create a responsive and adaptive learning environment that enhances focus by accommodating the unique needs and preferences of each learner in a dynamic, real-time manner.

IV. CONCLUSION

The literature review on attention distraction in learning reveals the complexity of this phenomenon and its implications for language acquisition. Attention distraction, defined as disruptions from desired focus, can stem from various internal and external factors. In the context of learning, mobile phones are a primary source of distraction, particularly through the use of social media and entertainment applications. The use of mobile phones not only impacts cognitive processes but also reduces learning effectiveness and overall academic performance.

The schematic visualization of attention distraction in mobile-based language learning shows that distraction arises from factors such as multitasking, notifications, and social media applications, which hinder attention allocation and working memory function. The direct impact of this distraction includes cognitive impairment and a decrease in academic productivity, which obstructs language mastery. Individual factors such as age, gender, and experience also affect the ability to manage distraction, underscoring the importance of adaptive strategies in the learning environment.

The new theoretical framework, The Interactive Model for Managing Attention Distraction, offers a holistic approach by incorporating cognitive, psychological, and social elements. This model adjusts the level of interaction and control in applications based on user characteristics, supports personalized attention regulation, and introduces real-time management that limits access to distracting features during study sessions. By focusing on individual needs, this model aims to enhance attention engagement and improve language learning outcomes.

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