A Theoretical Framework for Mobile-Assisted Language Learning in Autonomous Listening

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Abstract

This study aims to develop a comprehensive Mobile-Assisted Language Learning (MALL) framework in autonomous listening, with the goal of enhancing learner autonomy, motivation, and listening comprehension. A qualitative research approach was employed, involving a critical review of 31 articles on prevalent theories in MALL research and five on Autonomous Language Learning (ALL) research, following Barbara Kitchenham's guidelines. Among 33 identified theories Situated Learning Theory (SLT) and Self-Determination Theory (SDT) were deemed to be the two most suitable theories for guiding mobile-assisted autonomous listening. SLT informs the design of mobile learning environments through elements such as real-world contexts, authentic activities, and social interactions, while SDT addresses learners' psychological needs, fostering autonomy, motivation, and competence. The resulting framework synthesizes seven core elements – use of tools, real-world context, authentic activity, social interaction, autonomy, motivation, and competence – demonstrating how the integration of SLT and SDT provides a productive foundation for designing mobile-assisted autonomous listening activities. This study makes a unique contribution through its critical analysis of prior research, culminating in the first MALL framework specifically focused on autonomous listening. The framework serves as a valuable resource for educators designing effective mobile-assisted listening activities and provides future researchers with a structured foundation for advancing the field of mobile-assisted autonomous listening.

Keywords: Mobile-assisted language learning; Autonomous language learning; Autonomous listening; Theoretical framework

Теоретическая основа для изучения языка с помощью мобильных устройств при автономном аудировании

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Аннотация
Целью данного исследования является разработка всеобъемлющей структуры изучения языка с помощью мобильных устройств (Mobile-Assisted Language Learning, MALL) в автономном слушании с целью повышения автономии, мотивации и понимания слушаемого учащегося. Был использован качественный исследовательский подход, включающий критический обзор 31 статьи о распространенных теориях в исследовании MALL и пяти статей об исследовании автономного изучения языка (Autonomous Language Learning, ALL) в соответствии с рекомендациями Барбары Китченхэм. Среди 33 выявленных теорий теория ситуативного обучения (Situated Learning Theory, SLT) и теория самоопределения (Self-Determination Theory, SDT) были признаны двумя наиболее подходящими теориями для руководства автономным слушанием с помощью мобильных устройств. SLT информирует о дизайне среды мобильного обучения с помощью таких элементов, как контексты реального мира, аутентичные действия и социальные взаимодействия, в то время как SDT решает психологические потребности учащихся, способствуя автономии, мотивации и компетентности. Полученная структура синтезирует семь основных элементов – использование инструментов, реальный контекст, аутентичную активность, социальное взаимодействие, автономию, мотивацию и компетентность – демонстрируя, как интеграция SLT и SDT обеспечивает продуктивную основу для разработки автономной деятельности по прослушиванию с использованием мобильных устройств. Это исследование вносит уникальный вклад посредством критического анализа предыдущих исследований, кульминацией которого является создание первой системы MALL, специально ориентированной на автономное прослушивание. Структура служит ценным ресурсом для педагогов, разрабатывающих эффективную деятельность по прослушиванию с использованием мобильных устройств, и предоставляет будущим исследователям структурированную основу для продвижения в области автономного прослушивания с использованием мобильных устройств.

Ключевые слова: Изучение языка с помощью мобильных устройств; Автономное изучение языка; Автономное слушание; Теоретическая основа

INTRODUCTION

The development of mobile technology is closely linked to the growth of autonomous language learning (ALL). Mobile devices have transformed the roles of teachers and learners, requiring teachers to relinquish some control and encouraging learners to adopt a more autonomous role (Stockwell & Wang, 2024). Mobile-Assisted Language Learning (MALL) has also been shown to effectively promote learners' academic achievement and autonomy (Diari et al., 2023). However, mobile devices can act as both facilitators and distractors in language learning (Stockwell & Wang, 2024). This dual role highlights the need for a framework to guide instructors and learners in effectively using mobile technology for ALL. Unfortunately, such a framework is still absent in existing research.

ALL has been a prominent topic of investigation among the four language skills, particularly in the areas of vocabulary and writing. For instance, Eleni Meletiadou (2023) examined the impact of Quizlet, a vocabulary learning app, on students' learning performance, autonomy, and metacognitive skills. Similarly, Shaista Rashid and Jocelyn Howard explored blogging as a tool for fostering independent writing outside the classroom (Rashid & Howard, 2023). The study demonstrated that engaging in independent writing through blogging not only increased participants' interest and autonomy but also enhanced their overall writing ability. In another study, Bin Shen, Barry Bai, and Weihe Xue investigated the impact of peer assessment on learner autonomy in Chinese college English writing classes, concluding that peer assessment was more effective than teacher assessment in promoting learner autonomy (Shen et al., 2020).

Among the four language skills, listening remains under-researched. Nevertheless, ALL through mobile technology is a particularly suitable and necessary approach for practising listening, as learners require more opportunities to access authentic input and produce meaningful output beyond the confines of traditional classroom settings (Bozorgian & Shamsi, 2022). Therefore, this research aims to develop a MALL framework specifically designed for autonomous listening.

LITERATURE REVIEW

Mobile-Assisted Language Learning

Mobile-Assisted Language Learning (MALL) has been proven effective in improving learners' academic performance across all language skills. Shirin Shafiei Ebrahimi (2024) highlights that using mobile technologies such as WhatsApp for writing exercises and group vocabulary practice enhances writing skills and student engagement. Similarly, digital flashcards have been shown to effectively improve learners' technical vocabulary knowledge (Koleini et al., 2024). In another study, Hassane Benlaghrissi and L. Meriem Ouahidi demonstrated that combining MALL with project-based learning can serve as an innovative instructional model for developing EFL learners' speaking skills (Benlaghrissi & Ouahidi, 2024). Additionally, the integration of metacognitive strategies with MALL has been found to enhance EFL learners' listening skills (Peng et al., 2024).

However, despite its successes, MALL is not without its challenges. A literature review by Rifat Kamasak, Mustafa Özbilgin, Derin Atay, and Altan Kar revealed that while most research highlights the positive effects of MALL – such as improved language performance, increased motivation, enhanced learner autonomy, personalised learning experiences (Kamasak et al., 2021), and extended time allocated for language practice – there are notable drawbacks. These include a lack of human interaction, pedagogical issues, external distractions, and monetary and technological concerns. Xuehong (Stella) He and Shawn Loewen (2022) also observed that many students experience low efficiency and engagement in mobile learning. Furthermore, a recent study comparing MALL tools like Babbel and Duolingo identified persistence of app use as a significant issue (Kessler et al., 2023). Duolingo, in particular, was criticised for its lack of interactive and personalised feedback (Solmaz, 2024).

Overall, while MALL offers significant opportunities for language learning, concerns about its limitations persist. Conflicting findings regarding its efficiency and engagement underscore the need for further investigation to maximise its strengths and address its weaknesses.

Autonomous Language Learning

David Little (2022) defines language learner autonomy as a teaching and learning dynamic where learners plan, implement, monitor, and evaluate their own learning. Phil Benson (2011) categorised methods for fostering learner autonomy into six approaches: resource-based, technology-based, learner-based, classroom-based, curriculum-based, and teacher-based. Among these, technology-based methods have gained prominence due to advancements in information technology. According to David M. Palfreyman and Philip Benson, autonomous learning now requires both awareness of and capability in utilising technical and social resources (Palfreyman, & Benson, 2019).

Mobile technology, in particular, has shown great potential in fostering language learner autonomy. Takeshi Sato, Fumiko Murase, and Tyler Burden (2020) found that MALL significantly contributes to L2 vocabulary recall and learner autonomy. Similarly, the combination of mobile learning with gamification has been shown to improve both learner autonomy and listening skills (Pham et al., 2021). The use of WhatsApp has also been found to enhance vocabulary learning and learner autonomy among Iranian intermediate EFL learners (Janfeshan et al., 2023).

Despite these advancements, autonomous listening remains an underexplored area in ALL research. Existing studies on autonomous listening primarily utilise web-based listening materials (Thi Mai, 2023; Yang, 2021) or pre-assigned content (Bozorgian et al., 2024). Only one SCOPUS-indexed article has investigated a learner's experience using mobile devices for autonomous listening (Fatimah et al., 2021). Furthermore, teaching and learning listening skills in EFL contexts often face challenges such as insufficient exposure to authentic input and limited learning opportunities beyond the classroom (Pyo & Lee, 2022). Mobile-assisted autonomous listening has the potential to address these challenges by providing learners with increased exposure and opportunities to practise listening skills. Therefore, this research focuses on exploring MALL in the context of autonomous listening.

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Existing MALL Framework

In recent years, several MALL frameworks have been developed across various domains. Olga Viberg, Barbara Wasson, and Agnes Kukulska-Hulme proposed a framework for MALL in self-regulated learning, aimed at guiding learning designers to support second language learners (Viberg et al., 2020) Safiya Okai-Ugbaje, Kathie Ardzejewska, and Ahmed Imran introduced a mobile learning framework tailored to higher education in low-income countries like Nigeria (Okai-Ugbaje et al., 2022). Similarly, Timothy Read and Elena Bárcena proposed a theoretical framework for developing Language MOOCs and MALL applications (Read & Bárcena, 2020). More recently, Xianyun Wang, Afendi Hamat, and Ng Lay Shi designed a pedagogical framework for MALL to facilitate effective teaching and learning (Wang et al, 2024).

Despite these advancements, existing MALL frameworks lack a specific focus on Autonomous Language Learning (ALL), particularly in relation to individual language skills. Listening, for example, is one of the most frequently used skills for some bilinguals who may lack proficiency in reading and writing in their second language (Grosjean & Byers-Heinlein, 2018). Given that different language skills require distinct approaches, developing a framework specifically targeting listening is essential. Moreover, as previously noted, autonomous listening remains an under-researched area. Consequently, this research aims to develop a MALL framework specifically designed for autonomous listening.

RESEARCH QUESTIONS

This study answers the following questions:
1) What theories are prevalent in MALL and ALL research?
2) What theories are suitable for facilitating MALL in autonomous listening?
3) How can a MALL framework in autonomous listening be developed?

METHODOLOGY

This study adopted a qualitative research approach to conduct a comprehensive critical analysis of prevalent theories in Mobile-Assisted Language Learning (MALL) and Autonomous Language Learning (ALL) research. The primary aim was to derive insights that could inform the development of a robust MALL framework for autonomous listening. The qualitative approach enabled an in-depth exploration and interpretation of existing theories within the context of MALL and ALL.

The steps for conducting the critical analysis were guided by Barbara Kitchenham's (2004) systematic review methodology and are outlined as follows:

Search Articles

The first step involved identifying empirical research in the areas of MALL and ALL that utilised learning theories. The SCOPUS database was selected as the primary

source for retrieving relevant articles due to its extensive coverage of peer-reviewed academic research.

To ensure comprehensive results, Boolean operators (OR and AND) were used to combine keywords effectively. The search was limited to articles published between 2014 and 2024, and the document type was restricted to journal articles. Table 1 provides an overview of the keywords used for the search and the corresponding number of articles retrieved.

Table 1. Searching keywords and articles found

No.	Keywords	N
1	mobile-assisted language learning AND theory	66
2	autonomous language learning OR language learner autonomy AND theory	11

Study Selection

The study inclusion and exclusion criteria are set as stated in Table 2.

Table 2. Inclusion and exclusion criteria

No.	Inclusion criteria	Exclusion criteria
1	Articles that are Empirical research	Articles that are not empirical research
2	Articles that are based on one or more learning theory	Articles that are not based on learning theory
3	Articles that are based on a learning theory suitable for designing listening activities	Articles that are based on a learning theory unsuitable for designing listening activities
4	Articles that are accessible	Articles that are not accessible

Based on the inclusion and exclusion criteria, 35 articles were excluded from the initial pool of 66 articles in MALL research. The reasons for exclusion are as follows:

1) 8 articles were not empirical research, such as literature reviews and commentaries.
2) 10 articles did not utilise a learning theory.
3) 15 articles were based on learning theories unsuitable for designing listening activities, including the Unified Theory of Acceptance and Use of Technology,

the Technology Acceptance Model, the Function Theory of Lexicography, and the Theory of Negotiation of Meaning.

4) 2 articles were inaccessible or unavailable.

As for ALL research, 6 articles were excluded from the initial pool of 11 articles. The reasons for exclusion are as follows:

1) 4 articles were not empirical research, such as literature reviews and commentaries.
2) 2 articles did not utilise a learning theory.

Data Extraction and Synthesis

A total of 31 articles in MALL research and 5 articles in ALL research were extracted and analysed. The thematic synthesis method, as outlined by Thomas and Harden (2008), was employed to extract the intended information from each article. This method consisted of three phases: line-by-line coding, development of descriptive themes, and generation of analytical themes.

In the first phase, line-by-line coding, each article was thoroughly reviewed to identify the theories underpinning the research. In the second phase, development of descriptive themes, the identified theories were organised into themes and presented in tables. The results for MALL research are reported in Table 3, while those for ALL research are presented in Table 5.

In the final phase, generation of analytical themes, the frequency of each theory appearing in the articles was calculated and ranked. The theories were then categorised into four overarching analytical themes based on common learning theories: behaviourism, cognitivism, constructivism, and connectivism. The results for MALL research are reported in Table 4, and those for ALL research are presented in Table 6.

This systematic approach ensured a structured and comprehensive extraction and synthesis of data, providing valuable insights into the theoretical foundations of MALL and ALL research.

FINDINGS

The results are presented in 4 parts. First, theories used in MALL and ALL research are shown. Then suitable theories for MALL in autonomous listening are discussed. Finally, the MALL framework for autonomous listening is formulated.

Theories used in MALL research

Based on the 31 articles of MALL, Table 3 reports the theories used in each article.

Table 3. Reviewed articles in MALL

No.	Authors (Year)	Theory
1	Dai & Wu (2024)	Cognitive Load Theory
2	Zhu et al. (2024)	Skill Acquisition Theory
3	Zeng & Fisher (2024)	Self-Determination Theory
4	Pan et al. (2024)	Expectation Confirmation Theory
5	Wu et al. (2023)	The Theory of Associative Fluency
6	Guo et al. 2023)	The Theory of Epistemology
7	Alamer & Al Khateeb (2023)	Self-Determination Theory
8	Al-Abidi et al. (2023)	Self-Determination Theory
9	Alamer et al. (2023)	Self-Determination Theory
10	Li & Liontas (2023)	Sociocultural Theory
11	Xueting Ye & Shi (2023)	Situated Learning Theory
12	Kessler (2023)	Metacognition Theory
13	Hoi at al. (2023)	Self-Determination Theory
14	Lee & Xiong (2023)	Social Support Theory; Stimulus-Organism-Response Theory
15	Faozi & Handayani (2023)	Self-Determination Theory
16	Byrne (2023)	Activity Theory
17	Hu, et al. (2023)	Flow theory
18	Annamalai et al. (2022)	Self-Determination Theory
19	Mroz & Thrasher (2022)	Complex Dynamic Systems Theory
20	Chen & Zhao (2022)	Self-Determination Theory
21	Hsu & Lin (2022)	Action Control Theory
22	Luo (2022)	Micro-Learning Theory
23	Jeon (2022)	Self-Determination Theory
24	Hsu & Lin (2021)	Action Control Theory
25	Wrigglesworth (2020)	Sociocultural Theory
26	Jiang & Zhang (2020)	Social Presence Theory
27	Wang & Christiansen (2019)	Self-Determination Theory
28	Hwang et al. (2019)	Cognitive Load Theory
29	Lilley & Hardman (2017)	Cultural-Historical Activity Theory
30	Barcomb et al. (2017)	Activity Theory
31	Wang & Suwanthep (2017)	Constructivism

Next, the frequency of theories used in MALL research and their common learning theories are listed in Table 4.

Table 4. Theories used in MALL research

No.	Theories	Frequency	Common Learning Theories
1	Self-Determination Theory	10	Cognitivism
2	Cognitive Load Theory	2	Cognitivism
3	Action Control Theory	2	Cognitivism
4	Activity Theory	2	Constructivism
5	Sociocultural Theory	2	Constructivism
6	Expectation Confirmation Theory	1	Cognitivism
7	Skill Acquisition Theory	1	Cognitivism
8	Cultural-Historical Activity Theory	1	Constructivism
9	Theory of Associative Fluency	1	Cognitivism
10	Theory of Epistemology	1	Constructivism
11	Social Presence Theory	1	Connectivism
12	Flow Theory	1	Cognitivism
13	Situated Learning Theory	1	Constructivism
14	Metacognition Theory	1	Cognitivism
15	Social Support Theory	1	Connectivism
16	Stimulus-Organism-Response Theory	1	Cognitivism
17	Complex Dynamic Systems Theory	1	Connectivism
18	Micro-Learning Theory	1	Constructivism
19	Constructivism	1	Constructivism

Overall, 19 theories were identified across the 31 MALL research articles, with one article utilising two theories. The Self-Determination Theory emerged as the most frequently used theory. Cognitive Load Theory, Action Control Theory, Activity Theory, and Sociocultural Theory were each used twice, while the remaining theories were used only once. These theories are distributed across three learning paradigms: cognitivism, constructivism, and connectivism.

Theories used in ALL research

Table 5 reports the theories used in 5 articles in ALL.

Table 5. Reviewed articles in ALL

No.	Authors (Year)	Theory
1.	Selvaraj et al. (2024)	Transactional Distance Theory
2	Zare & Aqajani Delavar (2022)	Self-Determination Theory
3	Shelton-Strong (2022)	Self-Determination Theory
4	Tiansoodeenon & Sitthitikul (2022)	Multiple Intelligence Theory
5	Hawkins (2017)	Self-Determination Theory

Next, the frequency of theories used in ALL research and their common learning theories are listed in Table 6.

Table 6. Theories used in ALL research

Theories	Frequency	Common Learning Theories
Self-Determination Theory	3	Constructivism
Transactional Distance Theory	1	Constructivism
Multiple Intelligence Theory	1	Cognitivism

Overall, three theories were identified across the five ALL research articles: Self-Determination Theory, Transactional Distance Theory, and Multiple Intelligence Theory, with Self-Determination Theory being the most frequently used. Both Self-Determination Theory and Transactional Distance Theory are categorised under constructivism, while Multiple Intelligence Theory is classified under cognitivism.

Theories for MALL in autonomous listening

According to Table 4, among the 19 theories used in MALL research and the 3 theories used in ALL research, Self-Determination Theory (SDT) appeared most frequently. SDT, a motivational theory of personality, development, and social processes, posits that satisfying three basic psychological needs – autonomy, competence, and relatedness – enhances individual functioning and well-being (Deci & Ryan, 2015). SDT is closely tied to learner autonomy and is widely applied in both MALL and ALL research. These three basic needs align with Benson's definition of learner autonomy, where Benson's notions of capacity and freedom reflect competence and autonomy in

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SDT (Hu & Zhang, 2017). SDT serves as a guiding framework for investigating students' needs for autonomy, competence, and relatedness within mobile applications (Jeno et al., 2022). Consequently, SDT was chosen as one of the theoretical bases for the MALL framework.

However, since SDT belongs to cognitivism and primarily focuses on learners' psychological aspects, an additional theory is required to complement SDT and inform the design of mobile-assisted autonomous listening activities. In Table 4, aside from the 8 theories classified under cognitivism, 11 other theories remain. Among these, Situated Learning Theory (SLT) is deemed the most suitable for designing mobile-assisted autonomous listening activities. According to a systematic review of theoretical frameworks in mobile learning (Chuah & Kabilan, 2022), principles such as Situated Learning and Collaborative Learning are highly engaging and beneficial for enhancing mobile language learning experiences. Since the framework focuses on listening, with limited collaboration between learners, Situated Learning is regarded as a key component.

The central concept of SLT is legitimate peripheral participation, which suggests that learners join communities of practitioners and that newcomers must fully engage in the socio-cultural practices of the community to acquire knowledge and skills (Lave & Wenger, 1991). Mahmoud M. S. Abdallah (2015) introduced the concept of "situated language learning" based on SLT, proposing various forms of situated learning, including communities of practice and authentic language learning.

Overall, SLT and SDT are identified as the most suitable theories for MALL in autonomous listening among the 19 theories reviewed.

The MALL Framework for Autonomous Listening

Based on Self-Determination Theory (SDT) and Situated Learning Theory (SLT), a comprehensive framework for mobile-assisted autonomous listening was formulated. This framework integrates the principles of autonomy, competence, and relatedness from SDT with SLT's emphasis on real-world context, authentic activities, social interactions, and the use of tools (see Figure 1).

Self-determination Theory

Autonomy refers to the sense of initiative and ownership in one's actions, which is fostered by experiencing interest and value and undermined by external manipulation, such as rewards or punishments (Ryan & Deci, 2020). Strategies to promote autonomy include providing choices and rationales for learning activities, understanding students' feelings about learning topics, and minimizing pressure and control (Niemiec & Ryan, 2009). In mobile-assisted autonomous listening, learners will have the freedom to select listening materials and activities that interest and suit them. They will also define their learning objectives, monitor their progress, and evaluate their outcomes independently.

Competence is the feeling of mastery, best supported in structured learning environments that provide optimal challenges, positive feedback, and growth opportunities (Ryan & Deci, 2020). It can be enhanced through effectance-relevant feedback and by offering tasks that are neither too easy nor too difficult (Niemiec & Ryan, 2009). In mobile-assisted autonomous listening, learners can adjust their listening time

and pace, benefiting from support provided by mobile learning apps, peers, and teachers. These features help students feel effective, supported, and competent in their learning journey.
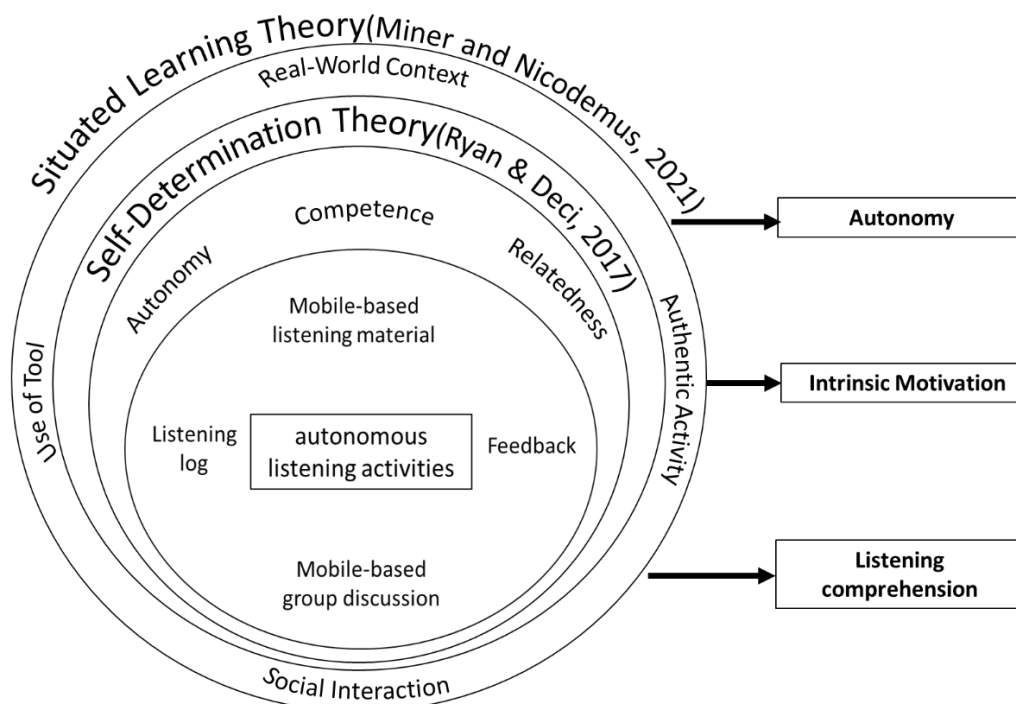

Figure 1. MALL framework for autonomous listening

Relatedness refers to the sense of belonging and connection, which is nurtured through respect and care (Ryan & Deci, 2020). In classrooms, relatedness is associated with students feeling that teachers genuinely like, respect, and value them (Niemiec & Ryan, 2009). In mobile-assisted autonomous listening, learners will engage in online learning communities with peers and teachers, sharing their learning experiences. This interaction fosters a sense of connection and involvement, enhancing their learning experience.

Situated Learning Theory

SLT emphasizes legitimate peripheral participation, where learners join communities of practitioners and engage in the socio-cultural practices of the community to acquire knowledge and skills (Lave & Wenger, 1991). SLT is widely applied in language education and interpreted through various lenses. For this framework, Annette Miner and Brenda Nicodemus' model of SLT, which includes real-world context, authentic activities, social interactions, and the use of tools (Miner & Nicodemus, 2021), was adopted.

The real-world context component of SLT emphasizes integrating authentic, everyday materials into the learning experience, bridging the gap between classroom learning and practical language use (Hwang et al., 2016). A situated real-world context helps students practice more frequently and produce meaningful, accurate sentences,

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enhancing their understanding of the language's cultural and situational aspects. In mobile-assisted autonomous listening, learners will engage with authentic materials, such as BBC news, to create a meaningful and immersive experience.

Authentic activities allow learners to use the target language in genuine contexts for real-world purposes (Ozvirer & Herrington, 2011). These activities promote organic and meaningful language exploration, enhancing learners' interest and practical skills. In mobile-assisted autonomous listening, students will participate in tasks such as maintaining a listening log, which mimics real-world applications.

The social interaction component underscores the importance of a dynamic and collaborative learning environment. Social interaction is crucial for language acquisition as it fosters collaboration and dynamic learning (Lytle & Kuhl, 2017). In mobile-assisted autonomous listening, learners will exchange ideas, share perspectives, and receive constructive feedback from peers and instructors, creating a collaborative and interactive learning environment.

Leveraging mobile technology is a key aspect of SLT. Technology provides learners with convenient access to authentic materials and resources, enabling them to engage with listening activities and communicate with peers and teachers (Hwang et al., 2016). In mobile-assisted autonomous listening, learners will use mobile apps to access listening materials, complete activities, and interact with their learning community via social media.

The goal of this framework is to address both learners' psychological needs and the design of the learning environment. First, SLT is employed to establish the learning environment, emphasizing real-world context, authentic activities, social interaction, and tools. Then, SDT is applied to satisfy learners' psychological needs for autonomy, competence, and relatedness within this environment.

Based on these two theories, mobile-assisted autonomous listening activities are designed to provide a holistic and effective language learning experience.

DISCUSSION

Among 31 research on Mobile-Assisted Language Learning (MALL), 19 different learning theories were identified, spanning cognitivism, constructivism, and connectivism. The most prevalent theory was Self-Determination Theory (SDT), which was used in nine articles. Other theories, such as Cognitive Load Theory, Action Control Theory, Activity Theory, and Sociocultural Theory, were each used twice. Overall, cognitivism emerged as the most common theoretical foundation in MALL research from 2014 to 2024, reflecting an increasing focus on learners' psychological aspects. In contrast, connectivism was the least utilized theoretical base, aligning with prior findings that MALL research often lacks emphasis on human interaction. This highlights the need for further exploration of MALL through the lens of connectivism.

In the context of Autonomous Language Learning (ALL), only 11 articles were found in SCOPUS from 2014 to 2024, indicating a significant gap in research in this area. Similar to MALL, SDT was the most frequently used theory in ALL research, underscoring its close connection to language learner autonomy. The other theories

identified in ALL research also relate to fostering autonomy, each addressing this goal through diverse approaches.

The proposed MALL framework for autonomous listening integrates key components from both SDT and Situated Learning Theory (SLT). This framework combines the principles of autonomy, competence, and relatedness from SDT with SLT's focus on real-world context, authentic activity, social interactions, and the use of tools. The aim is to create a comprehensive framework that addresses learners' psychological needs while also designing an effective learning environment.

According to SDT, the framework prioritizes students' basic psychological needs. Autonomy is supported by enabling students to engage in listening activities outside the classroom without teacher intervention. Competence is facilitated through app features that allow learners to adjust playback speed, pause, access transcripts, and receive teacher feedback. Relatedness is fostered by enabling interaction with teachers and peers through group chats on platforms like WhatsApp, both before and after listening activities. By meeting these needs, intrinsic motivation and the internalization of external motivation can be enhanced, leading to improved academic achievement (Ryan & Deci, 2020).

The framework also incorporates Miner and Nicodemus's SLT model, which aligns well with the principles of language learning. To complement SDT, SLT provides a suitable learning environment by emphasizing real-world context, authentic activities, social interaction, and the use of tools. Real-world context is addressed by allowing students to choose when and where to listen, using authentic materials such as podcasts, news, and stories available through the app. Authentic activity is incorporated by requiring students to grasp the general meaning of the material and maintain a listening log, rather than merely completing follow-up questions. Social interaction is supported by involving students in online learning communities where they can exchange feedback with peers and teachers. The use of tools is optimized through mobile apps, which provide easy access to authentic materials and facilitate online communication.

The uniqueness of this framework lies in its integration of SDT and SLT components to support MALL in autonomous listening. This integration also enables an analysis of its effects on learners' autonomy, motivation, and listening comprehension. The framework leverages insights from prior MALL and ALL research to design activities that enhance autonomy, intrinsic motivation, and listening comprehension.

CONCLUSION

A critical analysis of 31 MALL articles and 11 ALL articles revealed prevalent theories used in these fields. SDT emerged as the most commonly used theory in both MALL and ALL research, reflecting an increasing interest in learners' psychological needs. However, the lack of connectivist theories highlights the need for more research focused on human interaction within MALL.

From the 21 identified theories, SDT and SLT were chosen as the theoretical foundations for the proposed MALL framework for autonomous listening. SLT was utilized to design a situated mobile learning environment, while SDT was employed to promote learner autonomy and motivation. The framework integrates key principles of

autonomy, competence, and relatedness from SDT with SLT's emphasis on real-world context, authentic activities, social interaction, and tools.

The resulting autonomous listening activities include mobile-based listening materials, listening logs, mobile-based group discussions, and feedback. These activities are designed to enhance learners' autonomy, increase intrinsic motivation, and improve listening comprehension. This framework provides valuable guidance for instructors, learners, and app developers engaged in mobile-assisted listening activities.

Instructors can use the framework to design materials and activities that support learner autonomy. Learners can leverage the framework to create their own listening activities, gaining greater exposure and learning opportunities. App developers can use the framework as a guideline for designing listening apps that facilitate learner autonomy.

Beyond providing a framework for practice, this study highlights the importance of theory in shaping how we understand and evaluate mobile learning tools. The findings suggest that educators, researchers, and developers need to be mindful of the theoretical assumptions they bring to the table. Tools may appear to be theory-neutral, but their use and interpretation are heavily influenced by the pedagogical frameworks applied. Future research could explore how divergent theoretical stances lead to different learning outcomes even when the same technology is used. This perspective invites more nuanced and reflective applications of mobile technologies in language education.

LIMITATIONS AND FUTURE STUDIES

While the proposed framework offers valuable guidance for mobile-assisted autonomous listening, it has certain limitations. The framework primarily focuses on listening skills and applying it to other language skills – such as reading, writing, and speaking – requires further investigation and adaptation. Although the theoretical foundations of SDT and SLT are applicable to all language skills, the specific design of learning activities would need to be tailored to each skill. Another limitation is that the framework is based solely on a critical review of existing literature and lacks empirical validation. Future studies should conduct empirical research to evaluate the framework's effectiveness in enhancing learner autonomy, motivation, and listening comprehension.

Further research could also explore the integration of connectivist principles into MALL to address the lack of human interaction in current frameworks. Investigating the framework's application across diverse contexts and learner groups would provide additional insights and refinements.

REFERENCES

Abdallah, M. M. S. (2015, May 20). *Situated language learning: Concept, significance and forms* [Worksheet presented at the College of Education Young Researchers' Conference]. Assiut University, Egypt. Available from https://www.researchgate.net/publication/277404276

Al-Abidi, S., Owais, A., & Alabedi, F. (2023). The Effects of Using MS Teams Mobile Application on Language Learners' Motivation During and After the Covid-19

Pandemic. *World Journal of English Language*, *13*(2), Article 2. https://doi.org/10.5430/wjel.v13n2p260

Alamer, A., & Al Khateeb, A. (2023). Effects of using the WhatsApp application on language learners motivation: A controlled investigation using structural equation modelling. *Computer Assisted Language Learning*, *36*(1–2), 149–175. https://doi.org/10.1080/09588221.2021.1903042

Alamer, A., Al Khateeb, A., & Jeno, L. M. (2023). Using WhatsApp increases language students' self-motivation and achievement, and decreases learning anxiety: A self-determination theory approach. *Journal of Computer Assisted Learning*, *39*(2), 417–431. https://doi.org/10.1111/jcal.12753

Annamalai, N., Kabilan, M., & Soundrarajan, D. (2022). Smartphone apps as a motivating tool in English language learning. *Indonesian Journal of Applied Linguistics*, *12*, 201–211. https://doi.org/10.17509/ijal.v12i1.46544

Barcomb, M., Grimshaw, J., & Cardoso, W. (2017). I Can't Program! Customizable Mobile Language-Learning Resources for Researchers and Practitioners. *Languages*, *2*(3), Article 3. https://doi.org/10.3390/languages2030008

Benlaghrissi, H., & Ouahidi, L. M. (2024). The impact of mobile-assisted project-based learning on developing EFL students' speaking skills. *Smart Learning Environments*, *11*(1). https://doi.org/10.1186/s40561-024-00303-y

Benson, P. (2011). *Teaching and researching: Autonomy in language learning* (2nd ed.). Routledge. https://doi.org/10.4324/9781315833767

Bozorgian, H., & Shamsi, E. (2022). Autonomous use of podcasts with metacognitive intervention: Foreign language listening development. *International Journal of Applied Linguistics*, *32*(3), 442–458. https://doi.org/10.1111/ijal.12439

Bozorgian, H., Muhammadpour, M., & Qara, R. (2024). EFL Listening Log: A Conceptual Replication of Kemp's (2010) Study on Motivating Autonomous Learning. *Iranian Journal of Language Teaching Research*, *12*(1), 65–82. https://doi.org/10.30466/ijltr.2024.121418

Byrne, J. (2023). A Determinant of Optimal and Inhibited Mobile Language Learning Activity Quiz Level Length. *International Journal of Interactive Mobile Technologies (iJIM)*, *17*, 47–68. https://doi.org/10.3991/ijim.v17i10.38417

Chen, Y., & Zhao, S. (2022). Understanding Chinese EFL Learners' Acceptance of Gamified Vocabulary Learning Apps: An Integration of Self-Determination Theory and Technology Acceptance Model. *Sustainability*, *14*, 11288. https://doi.org/10.3390/su141811288

Chuah, K.-M., & Kabilan, M. K. (2022). The Development of Mobile Applications for Language Learning: A Systematic Review of Theoretical Frameworks. *International Journal of Learning, Teaching and Educational Research*, *21*(8), 253–270. https://doi.org/10.26803/ijlter.21.8.15

Dai, Y., & Wu, Z. (n.d.). Learning (semi-)technical music words with mobile dictionary and/or machine-translation apps: Performances and perceptions. *Computer Assisted Language Learning*, 1–22. https://doi.org/10.1080/09588221.2024.2412788

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Deci, E. L., & Ryan, R. M. (2015). Self-Determination Theory. In J. D. Wright (Ed.), *International Encyclopedia of the Social & Behavioral Sciences* [2nd ed.] (pp. 486–491). Elsevier. https://doi.org/10.1016/B978-0-08-097086-8.26036-4

Diari, K. P. Y., Suwarna, S., & Suweta, I. M. (2023). Mobile Technology-Mediated Language Learning: A Quantitative Study to Unravel Language Learners' Achievement and Autonomy. *World Journal of English Language*, *13*(5), 354–364. https://doi.org/10.5430/wjel.v13n5p354

Ebrahimi, S. S. (2024). Effects of mobile messaging applications on writing skill. *Ampersand*, *13*. https://doi.org/10.1016/j.amper.2024.100209

Faozi, F. H., & Handayani, P. W. (2023). The Antecedents of Mobile-Assisted Language Learning Applications Continuance Intention. *Electronic Journal of E-Learning*, *21*(4), 299–313. https://doi.org/10.34190/ejel.21.4.2744

Fatimah, A., Santiana, S., & Sulastri, F. (2021). Learner's experience on the use of mobile devices for autonomous listening: A narrative inquiry. *Journal of Language and Linguistic Studies, 17*(1), 193–204. https://doi.org/10.17263/jlls.903375

Green, C., Eady, M., & Andersen, P. (2018). Preparing quality teachers: Bridging the gap between tertiary experiences and classroom realities. *Teaching and Learning Inquiry*, *6*(1), Article 1. https://doi.org/10.20343/teachlearninqu.6.1.10

Grosjean, F., Byers-Heinlein, K., Antoniou, M., Grüter, T., Hartsuiker, R. J., Peña, E. D., Bedore, L. M., & Shi, L.-F. (2018). *The listening bilingual: Speech perception, comprehension, and bilingualism*. Wiley Blackwell. https://doi.org/10.1002/9781118835722

Guo, B., Wang, Y., & Yin, J. (2023). A multi-perspective reflection on college students' English vocabulary and language skills learning under the theory of epistemology. *European Journal for Philosophy of Religion, 15*(4), Article 4. https://doi.org/10.24204/ejpr.2023.4000

Hawkins, S. (2017). Cooperative learning's role in in enhancing motivation through autonomy: Possibilities and limitations within a Japanese context. *Asian EFL Journal*, *19*, 62–77.

He, X. (Stella), & Loewen, S. (2022). Stimulating learner engagement in app-based L2 vocabulary self-study: Goals and feedback for effective L2 pedagogy. *System*, *105*, 102719. https://doi.org/10.1016/j.system.2021.102719

Hoi, L. M., Sun, Y., Ke, W., & Im, S. K. (2023). Visualizing the behavior of learning European Portuguese in different regions of the world through a mobile application. *IEEE Access, 11*, 113913–113930. https://doi.org/10.1109/ACCESS.2023.3324390

Hsu, H.-T., & Lin, C. (2021). Extending the technology acceptance model of college learners' mobile-assisted language learning by incorporating psychological constructs. *British Journal of Educational Technology*, *53*. https://doi.org/10.1111/bjet.13165

Hsu, H. T., & Lin, C. C. (2022). Factors Influencing University Students' Intention to Engage in Mobile-assisted Language Learning through the Lens of Action Control Theory. *Educational Technology and Society*, *25*(4), 29–42.

Hu, L., Hei, D., Wang, H., & Dai, X. (2023). Chinese college students collaborative mobile-assisted language learning experience and flow as a key factor for further adoption. *Frontiers in Psychology*, *14*. https://doi.org/10.3389/fpsyg.2023.1165332

Hu, P., & Zhang, J. (2017). A pathway to learner autonomy: a self-determination theory perspective. *Asia Pacific Education Review*, *18*(1), 147–157. https://doi.org/10.1007/s12564-016-9468-z

Hwang, G.-J., Hsu, T.-C., & Hsieh, Y.-H. (2019). Impacts of different smartphone caption/subtitle mechanisms on English listening performance and perceptions of students with different learning styles. *International Journal of Human-Computer Interaction*, *35*(4–5), 333–344. https://doi.org/10.1080/10447318.2018.1543091

Hwang, W.-Y., Shih, T. K., Ma, Z.-H., Shadiev, R., & Chen, S.-Y. (2016). Evaluating listening and speaking skills in a mobile game-based learning environment with situational contexts. *Computer Assisted Language Learning*, *29*(4), Article 4. https://doi.org/10.1080/09588221.2015.1016438

Janfeshan, K., Sharhan, A. N., & Janfeshan, M. M. (2023). Effects of Using the WhatsApp Application on Iranian Intermediate EFL Learners' Vocabulary Learning and Autonomy. *The International Review of Research in Open and Distributed Learning*, *24*(3), 145–163. https://doi.org/10.19173/irrodl.v24i3.7185

Jeno, L. M., Egelandsdal, K., & Grytnes, J.-A. (2022). A qualitative investigation of psychological need-satisfying experiences of a mobile learning application: A Self-Determination Theory approach. *Computers and Education Open*, *3*, 100108. https://doi.org/10.1016/j.caeo.2022.100108

Jeon, J. (2022). Exploring a self-directed interactive app for informal EFL learning: A self-determination theory perspective. *Education and Information Technologies*, *27*(4), 5767–5787. https://doi.org/10.1007/s10639-021-10839-y

Jiang, D., & Zhang, L. J. (2020). Collaborating with 'familiar' strangers in mobile-assisted environments: The effect of socializing activities on learning EFL writing. *Computers & Education*, *150*, 103841. https://doi.org/10.1016/j.compedu.2020.103841

Kamasak, R., Özbilgin, M., Atay, D., & Kar, A. (2021). The Effectiveness of Mobile-Assisted Language Learning (MALL). In *IGI Global eBooks* (pp. 194–212). https://doi.org/10.4018/978-1-7998-4769-4.ch008

Kessler, M. (2023). Supplementing mobile-assisted language learning with reflective journal writing: A case study of Duolingo users' metacognitive awareness. *Computer Assisted Language Learning*, *36*(5–6), 1040–1063. https://doi.org/10.1080/09588221.2021.1968914

Kessler, M., Loewen, S., & Gönülal, T. (2023). Mobile-assisted language learning with Babbel and Duolingo: Comparing L2 learning gains and user experience. *Computer Assisted Language Learning*. *38*(4), 690-714 https://doi.org/10.1080/09588221.2023.2215294

Kitchenham, B. (2004). *Procedures for performing systematic reviews* (Joint Technical Report TR/SE-0401). Keele University, Department of Computer Science, & National ICT Australia Ltd.

Koleini, N., Boroughani, T., Eslami, Z. R., & Xodabande, I. (2024). Exploring the impacts of mobile-assisted learning on university students' technical vocabulary knowledge. *International Journal of Educational Research Open*, *7*. https://doi.org/10.1016/j.ijedro.2024.100344

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge University Press. https://doi.org/10.1017/CBO9780511815355

Lee, J.-C., & Xiong, L. (2023). Exploring learners' continuous usage decisions regarding mobile-assisted language learning applications: A social support theory perspective. *Education and Information Technologies*, *28*(12), 16743–16769. https://doi.org/10.1007/s10639-023-11884-5

Li, Z., & Liontas, J. (2023). English VP Idiom Learning and WeChat: Developing Idiomatic Competence among Chinese EFL Learners. *Iranian Journal of Language Teaching Research*, *11*(2). https://doi.org/10.30466/ijltr.2023.121332

Lilley, W., & Hardman, J. (2017). "You focus, I'm talking": A CHAT analysis of mobile dictionary use in an advanced EFL class. *Africa Education Review*, *14*, 1–19. https://doi.org/10.1080/18146627.2016.1224592

Little, D. (2022). Language learner autonomy: Rethinking language teaching. *Language Teaching*, *55*(1), 64–73. https://doi.org/10.1017/S0261444820000488

Luo, L. (2022). Novel micro-learning-based mobile-assisted language app for Mandarin Chinese. *Journal of Applied Learning and Teaching*, *5*(Sp. Iss. 1), Article Sp. Iss. 1. https://doi.org/10.37074/jalt.2022.5.s1.5

Lytle, S. R., & Kuhl, P. K. (2017). Social Interaction and Language Acquisition. In *The Handbook of Psycholinguistics* (pp. 615–634). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118829516.ch27

Meletiadou, E. (2023). Experimenting With AI-Powered Learning Tools and Mobile-Assisted Learning to Improve Student Learning Performance, Autonomy, and Metacognitive Skills: A Case Study of Quizlet. In E. Meletiadou (Ed.), *Handbook of Research on Redesigning Teaching, Learning, and Assessment in the Digital Era* (pp. 21-41). IGI Global Scientific Publishing. https://doi.org/10.4018/978-1-6684-8292-6.ch002

Miner, A., & Nicodemus, B. (2021). *Situated learning in interpreter education: From the classroom to the community*. Palgrave Macmillan. https://doi.org/10.1007/978-3-030-68904-9

Mroz, A. P., & Thrasher, T. (2022). Proficiency development and smartphone usage in study abroad: Microgenetic longitudinal case studies of French learners. *Foreign Language Annals*, *55*(2), 455–493. https://doi.org/10.1111/flan.12619

Niemiec, C., & Ryan, R. (2009). Autonomy, competence, and relatedness in the classroom: Applying self-determination theory to educational practice. *Theory and Research in Education*, *7*, 133–144. https://doi.org/10.1177/1477878509104318

Okai-Ugbaje, S., Ardzejewska, K., & Imran, A. (2022). A mobile learning framework for higher education in resource constrained environments. *Education and Information Technologies*, *27*, 1–23. https://doi.org/10.1007/s10639-022-11094-5

Palfreyman, D. M., & Benson, P. (2019). Autonomy and Its Role in English Language Learning: Practice and Research. In X. Gao (Ed.), *Second Handbook of English*

Language Teaching (pp. 661–681). Springer International Publishing. https://doi.org/10.1007/978-3-030-02899-2_38

Pan, L., Ye, Y., & Li, X. (2024). Factors affecting Thai EFL students' behavioral intentions toward mobile-assisted language learning. *Frontiers in Education*, *9*. https://doi.org/10.3389/feduc.2024.1333771

Peng, C., Rashid, S. Md., & Jiang, L. (2024). The use of metacognitive strategies within a mobile-assisted language learning context: Enhancing Chinese EFL learner's listening skills. *Forum for Linguistic Studies, 6*(6), 410–428. https://doi.org/10.30564/fls.v6i6.7439

Pham, L. L. N., Nguyen, H. T., & Le, V. T. K. (2021). Triggering Students' Learning Autonomy Using the Combination of M-Learning and Gamification: A Case Study at Nguyen Tat Thanh University. *Teaching English with Technology*, *21*(2), 66–91.

Pyo, J., & Lee, C. H. (2022). Academic engagement and task completion in L2 listening through mobile-assisted blended learning (MABL) in higher education. *Korean Journal of English Language and Linguistics, 22*, 1389–1416. https://doi.org/10.15738/kjell.22..202212.1389

Rashid, S., & Howard, J. (2023). Blogging with smartphones for independent writing practice beyond the EFL classroom. *Indonesian Journal of Applied Linguistics*, *12*(3), 790–801. https://doi.org/10.17509/ijal.v12i3.46086

Read, T., & Bárcena, E. (2020). Hacia un marco para los MOOC de idiomas y el aprendizaje de idiomas con asistencia móvil [Towards a framework for language MOOCs and mobile-assisted language learning]. *Propósitos y Representaciones*, *8*(1). https://doi.org/10.20511/pyr2020.v8n1.470

Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, *61*, 101860. https://doi.org/10.1016/j.cedpsych.2020.101860

Sato, T., Murase, F., & Burden, T. (2020). An empirical study on vocabulary recall and learner autonomy through mobile-assisted language learning in blended learning settings. *CALICO Journal, 37*(3), 254–276. https://doi.org/10.1558/cj.40436

Selvaraj, V., Shah, A. H., S, D. H. P. K., Subasini, N. S., & Ameen, D. A. S. (2024). Autonomous language learning in CALL environments using transactional distance theory. *Computer-Assisted Language Learning Electronic Journal, 25*(1), 148–167. https://callej.org/index.php/journal/article/view/99/369

Shelton-Strong, S. J. (2022). Advising in language learning and the support of learners' basic psychological needs: A self-determination theory perspective. *Language Teaching Research*, *26*(5), 963–985. https://doi.org/10.1177/1362168820912355

Shen, B., Bai, B., & Xue, W. (2020). The effects of peer assessment on learner autonomy: An empirical study in a Chinese college English writing class. *Studies in Educational Evaluation*, *64*, 100821. https://doi.org/10.1016/j.stueduc.2019.100821

Solmaz, O. (2024). Impacts of digital applications on emergent multilinguals' language learning experiences: The case of Duolingo. *Education and Information Technologies*. https://doi.org/10.1007/s10639-024-13185-x

Stockwell, G., & Wang, Y. (2024). Expanding the learning ecology and autonomy of language learners with mobile technologies. *Educational Technology and Society*, *27*(2), 60–69. https://doi.org/10.30191/ETS.202404_27(2).SP05

Thi Mai, V. L. (2023). Autonomy-Based Listening: Vietnamese University Students' Perceptions of Self-Access Web-Based Listening Practices. *SiSal Journal*, *14*(3), 267–286. https://doi.org/10.37237/140303

Thomas, J., & Harden, A. (2008). Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Medical Research Methodology*, *8*, 45. https://doi.org/10.1186/1471-2288-8-45

Tiansoodeenon, M., & Sitthitikul, P. (2022). Effects of Multiple Intelligences-based Instruction on English Achievement and Learner Autonomy of Thai Tertiary Students. *The Journal of AsiaTEFL*, *19*(4), 1250–1266. https://doi.org/10.18823/asiatefl.2022.19.4.7.1250

Viberg, O., Wasson, B., & Kukulska-Hulme, A. (2020). Mobile-assisted language learning through learning analytics for self-regulated learning (MALLAS): A conceptual framework. *Australasian Journal of Educational Technology*, *36*(6), 34–52. https://doi.org/10.14742/ajet.6494

Wang, F., & Suwanthep, J. (2017). Constructivism-Based Mobile Application for EFL Vocabulary Learning. *International Journal of Learning and Teaching*. https://doi.org/10.18178/ijlt.3.2.106-112

Wang, X., Hamat, A. B., & Ng, L. S. (2024). Designing a pedagogical framework for mobile-assisted language learning. *Heliyon*, *10*(7), e28102. https://doi.org/10.1016/j.heliyon.2024.e28102

Wang, Y., & Christiansen, M. S. (2019). An Investigation of Chinese Older Adults' Self-Directed English Learning Experience Using Mobile Apps. *International Journal of Computer-Assisted Language Learning and Teaching (IJCALLT)*, *9*(4), 51–71. https://doi.org/10.4018/IJCALLT.2019100104

Wrigglesworth, J. (2020). Using smartphones to extend interaction beyond the EFL classroom. *Computer Assisted Language Learning*, *33*(4), 413–434. https://doi.org/10.1080/09588221.2019.1569067

Wu, W.-C., Lin, I.-T., & Chen Hsieh, J. (2023). Ubiquitous English Idiom Learning Through Mobile Applications: Learning Outcomes, Motivation, Anxiety, and Behavioral Patterns. *The Asia-Pacific Education Researcher*, *32*(5), 665–684. https://doi.org/10.1007/s40299-022-00685-y

Xueting Ye, S., & Shi, J. (2023). Investigating the potential of changing the smartphone system language to L2 for facilitating vocabulary learning and motivation. *Language Teaching Research*, 13621688221145565. https://doi.org/10.1177/13621688221145565

Yang, F.-Y. (2021). EFL learners' autonomous listening practice outside of the class. *SiSal Journal*, *12*(4), 328–346. https://doi.org/10.37237/110403

Zare, J., & Aqajani Delavar, K. (2024). Enhancing English learning materials with data-driven learning: A mixed-methods study of task motivation. *Journal of Multilingual and Multicultural Development*, *45*(9), 4011–4027. https://doi.org/10.1080/01434632.2022.2134881

Zeng, C., & Fisher, L. (2024). Opening the "Black Box": How Out-of-Class Use of Duolingo Impacts Chinese Junior High School Students' Intrinsic Motivation for English. *ECNU Review of Education*, *7*(2), 283–307. https://doi.org/10.1177/20965311231171606

Zhu, J., Zhang, X., & Li, J. (2024). Using AR filters in L2 pronunciation training: Practice, perfection, and willingness to share. *Computer Assisted Language Learning*, *37*(5–6), 1364–1396. https://doi.org/10.1080/09588221.2022.2080716

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