



A Review on Learner Autonomy with Mobile-Assisted Language Learning for EFL Learners at the Tertiary Level

Xianxin Hui¹, Zhifang Liu², Yongmei Chi³

¹Aviation & Automobile School, Chongqing Youth Vocational & Technical College, Chongqing, China

²Educational Studies, Universiti Sains Malaysia, Penang, Malaysia

³General Education School, Chongqing Youth Vocational & Technical College, Chongqing, China

Email: huixianxin@cqyu.edu.cn, liuzhifang@student.usm.my

How to cite this paper: Hui, X.X., Liu, Z.F. and Chi, Y.M. (2023) A Review on Learner Autonomy with Mobile-Assisted Language Learning for EFL Learners at the Tertiary Level. *Open Access Library Journal*, 10: e10606.

<https://doi.org/10.4236/oalib.1110606>

Received: August 10, 2023

Accepted: September 15, 2023

Published: September 18, 2023

Copyright © 2023 by author(s) and Open Access Library Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

With the higher requirement of learner autonomy for EFL learners at the tertiary level, mobile-assisted language learning (MALL) is raising more and more attention for autonomous language learning. It is not easy to find appropriate mobile applications in this modern era with constant technology development and application updating. EFL learners also need more time and chance to be accustomed to mobile use in learner autonomy. Given this, the purpose of this study is to analyze the effect of mobile applications on autonomous learning and language skill improvement. It also explores what aspects of learner autonomy have been developed for EFL learners at the tertiary level with the guidance of two autonomous versions which are psychological and technical perspectives by performing a literature review of 12 articles from 2018 to 2023. Through synthesizing features of mobile applications, aspects of learner autonomy, and developed language skills of these articles, it is shown that mobile applications, especially social media and educational applications have played a beneficial role in autonomous learning for EFL learners at the tertiary level. Finally, multiple mobile application usage, digital literacy cultivation, and balanced language skills development are emphasized for future autonomous learning for EFL learners at the tertiary level.

Subject Areas

Educational Technology, Language Education, Teaching and Learning Technologies

Keywords

EFL Learners, Learner Autonomy, MALL, Mobile Applications, Tertiary Level

1. Introduction

1.1. Mobile-Assisted Language Learning

With the rapid development of technology, mobile devices are widely utilized in the language learning context (Fredrick & Karthikeyan, 2018) [1] due to their flexibility, affordability, and user-friendliness. This has expanded the field of computer-assisted language learning (CALL) to include mobile-assisted language learning (MALL) as a brand-new method of EFL learning (Puebla *et al.*, 2021) [2]. MALL, a branch of mobile learning (m-learning), is viewed as a pedagogical approach investigating various tools for educational uses in language learning (Alamer, 2015 [3]; Shadiev *et al.*, 2019 [4]; Loewen *et al.*, 2019 [5]).

Assisted with mobile tools, learners can enjoy a more interaction-focused learning process and multimedia learner-centered learning with a variety of activities. Previous studies demonstrated that MALL has a positive effect on L2 vocabulary learning (Chen, Liu & Huang, 2019) [6]. Meanwhile, according to Kukulska-Hulme (2016) [7], MALL provides EFL learners more autonomy by giving them more freedom and options in terms of the language they learn, how it is delivered, where they learn, and when they learn it. Therefore, MALL is regarded as an effective approach for a non-native speaker to learn a language.

1.2. Learner Autonomy of EFL Learners at the Tertiary Level

Learner autonomy is regarded as an important capacity for effective language learning (Chang, 2020 [8]; Tayjasanant & Suraratdecha, 2016 [9]). It has attracted attention since the 1980s. According to Holec (1981) [10], learner autonomy was defined as “the ability to take charge of one’s own learning” (p. 3). Following this, researchers such as Benson (1997) [11], Cotterall (1995) [12], Little (1991) [13], Oxford (2003) [14], and Pennycook (1997) [15] gave varied perspectives, definitions, and models of learner autonomy in EFL contexts.

In addition, three fundamental versions including technical, psychological, and political versions of autonomy proposed by Benson (1997) [11] are influential and widely used. Benson (1997) [11] claims that the technical perspective on comprehending the notion of learner autonomy is focused on the technical abilities necessary for controlling autonomous learning. The psychological perspective takes into account the learners’ intrinsic mental capacities (Benson, 1997) [11]. While the political perspective has increasingly been given up since learner autonomy is more likely to be pedagogical than political (Benson, 2001) [11]. Hence, Benson’s (1997) [11] technical and psychological versions of learner autonomy are utilized here in light of how to develop learner autonomy in the current study. As to the technical version, technical skills including metacognitive, social, and affective strategies are emphasized in developing learner autonomy (O’Malley & Chamot, 1990 [16]; Oxford, 1990 [17]). In terms of the psychological version, 3 major variables motivation, emotion, and belief are associated with autonomous learning (Benson, 2013) [18].

This research focuses on learner autonomy of EFL learners at the tertiary level which refers to individuals who are learning English as a foreign language at the tertiary level, typically including students in universities, colleges, and other higher education institutions, as well as high school graduates about to study in university. In comparison to previous levels of education, it is typically true that EFL learners at the tertiary level are required higher learner autonomy for being given more opportunities to learn independently. Tuan (2021) [19] claimed that one of the important objectives for students in any language program in Vietnam is learner autonomy, particularly in light of the fact that the majority of the country's universities use a credit-based system that calls for students to assume greater responsibility for their own learning. However, owing to different language proficiency and cultural backgrounds, learner autonomy varies among individuals and in different contexts (Benson, 2013) [18]. When they enroll in universities or colleges where teachers' roles change from merely instructing to facilitating and moderating, the majority of them are not well ready for autonomous English learning. As a result, this may lead to students becoming disoriented about their learning strategies and have a negative influence on their motivation to self-learning (Xu, 2014) [20].

1.3. Mobile-Assisted Autonomous Learning of EFL Learners at the Tertiary Level

In this age of digital technology, MALL has emerged as a useful strategy for fostering the development of learner autonomy in the context of EFL (Behforouz & Frumuselu, 2020) [21]. According to some studies (Alzubi, 2019 [22]; Fabian, Topping & Barrons, 2018 [23]), learners who are exposed to EFL learning materials can use their smartphone's features, applications, and learning strategies on their own in an independent learning context to promote autonomous learning skills and subsequently improve their language competence. However, there are persistent problems inhibiting autonomous English learning. Owing to the overwhelming quantity of mobile applications available, it is challenging for learners to choose suitable ones for themselves (Metruk, 2020) [24] owing to unfamiliarity with the features of mobile applications in language learning. In addition, some EFL learners don't acclimatize themselves very well to using mobile applications for autonomous learning and are initially hesitant to use mobile applications in their EFL learning (Sato *et al.*, 2020) [25].

According to Benson (2013) [18], autonomy is "a capacity that can be developed and to understand how it can be developed we need a broader picture of the potential for learner control over language learning" (p.92). It means that learner autonomy is an ability that can be developed by how to control their language learning and this potential is possible to be inspired purposely. Therefore, based on the above concerns, this research aims to provide policymakers, educators, and students with guidelines for recognizing the value of mobile applications in autonomous learning and what aspects of learner autonomy have

been developed for EFL learners at the tertiary level with the guidance of two autonomous versions which is psychological and technical perspectives.

To achieve this goal, this review is conducted based on answering the following research questions:

- 1) For EFL learners at the tertiary level, what features do mobile applications have in developing learner autonomy?
- 2) For EFL learners at the tertiary level, what aspects of learner autonomy are affected by mobile applications?
- 3) For EFL learners at the tertiary level, what language skills have been improved during mobile-assisted autonomous learning?

2. Method

2.1. Data Collection

Regarded as the two primary databases for citation analysis according to Singh *et al.* (2021) [26], Scopus and Web of Science (WoS) were selected as the main databases for literature retrieval in this study. With deep consideration, the search process was a manual search of related journal papers since 2018 to explore the influence of MALL on learner autonomy for EFL learners at the tertiary level in the past five years based on the following illustration ways of keywords. To ensure the high relevance to autonomy, “learner autonomy” or “autonomous learning” was used for literature retrieval in titles both in Scopus and Web of Science.

After searching the keywords, a total of 5192 articles had been retrieved. Through refining the search criteria including publication year, document type, publication stage, source publication type, open access, and language, there remained 819 articles. According to the criteria of topic relevance to MALL, EFL learners at the tertiary level by scanning the title and abstract, the most suitable 12 articles were included for further analysis. The detailed article selection processing is presented in the following **Figure 1**.

2.2. Inclusion/Exclusion Criteria

These 12 full-text articles are finally chosen to analyze in the light of the following inclusion criteria which are presented in **Table 1**.

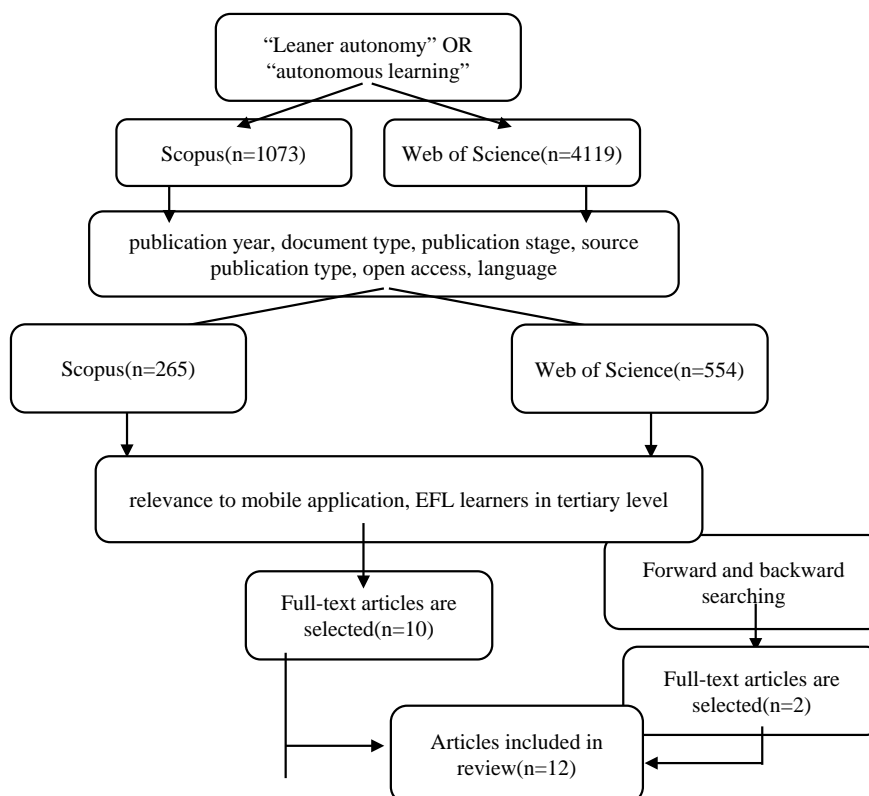
The following are the exclusion criteria or factors that preclude manuscripts from being included in the review article (**Table 2**).

Table 1. The inclusion criteria.

Inclusion criteria
1. period of article publishing from 2018 to 2023
2. peer-reviewed articles
3. English articles
4. focused on EFL learners at the tertiary level
5. focused on mobile applications assisting learner autonomy

Table 2. The exclusion criteria.

Exclusion criteria
1. conference papers, review studies, conference papers, and book chapters
2. articles in languages other than English
3. articles not focusing on MALL and learner autonomy
4. participants who are not EFL learners at the tertiary level
5. inaccessible full-text articles

**Figure 1.** The flow of the review process.

3. Findings

A total of 12 articles are chosen from these two databases. An overview of the research design is given in **Table 3** to make a basic analysis for a better understanding of the above questions. The research participants are all EFL learners at the tertiary level who are available to use mobile applications. It is worth mentioning that there are only male participants in 2 articles due to cultural restrictions (Alzubi & Singh, 2018 [27]; Alzubi *et al.*, 2019 [28]). When it refers to the research method, the quantitative method is applied in 6 articles. And then mixed methods and qualitative methods are used in 3 articles separately. Besides, 3 research contexts are considered in these articles which are inside the classroom ($n = 2$), outside the classroom ($n = 5$) as well as inside and outside the classroom ($n = 5$).

Table 3. The research design of 12 articles.

	Author(s)	Research method	Research participants	Context
1	Trang (2022)	Qualitative	first-year EFL college or university students	inside and outside the classroom
2	Inpeng and Nomnian (2022)	Qualitative	EFL undergraduate students	inside and outside the classroom
3	Wang and Jiang (2021)	Mixed	first-year EFL undergraduate students	inside and outside the classroom
4	Wu and Miller (2019)	Qualitative	EFL university students	outside the classroom
5	Alamer and Al-Khateeb (2021)	Quantitative	undergraduate students in the foundation year	outside the classroom
6	Alzubi <i>et al.</i> (2019)	Quantitative	EFL undergraduates at Saudi Arabia Deanship of Preparatory Year	inside and outside the classroom
7	Alzubi & Singh (2018)	Quantitative	EFL undergraduates at Saudi Arabia Deanship of Preparatory Year	inside and outside the classroom
8	Behforouz and Frumuselu (2020)	Mixed	EFL undergraduate students	inside the classrooms
9	Zieni (2019)	Mixed	high school graduates for undergraduate study	inside the classroom
10	Daly (2022)	Quantitative	EFL postgraduate students	outside the classroom
11	Sato <i>et al.</i> (2020)	Quantitative	first-year EFL undergraduate students	outside the classroom
12	Borova <i>et al.</i> (2021)	Quantitative	EFL undergraduate students acquiring the bachelor's degree	outside the classroom

Research Question 1: For EFL Learners at the Tertiary Level, What Features Do Mobile Applications Have in Developing Learner Autonomy?

Through summarizing and comparing the main features of mobile applications in these studies, it is interesting to see that there are mainly 2 types of mobile applications widely used in developing learner autonomy for EFL learners at the tertiary level, namely social media and education applications.

As shown in **Table 4**, social media applications including WeChat, WhatsApp, YouTube, and Facebook are the greatest contributors making up about 67% of 8 out of 12 articles. For instance, Wang and Jiang (2021) [29] concentrated on the practice of posting writing on WeChat Moments and looked at how it affected students' writing abilities and autonomy. Meanwhile, WhatsApp, a popular social networking mobile app, was applied to investigate the relationship between teachers' informal usage of it and its relation to students' autonomous motivation (Alamer & Al-Khateeb, 2021) [30].

Meanwhile, educational applications such as Quizlet, WebQuests, and Google Classroom are concerned in 4 studies taking up approximately 33%. In the research of Daly (2022) [31], Quizlet, as a free, user-friendly, very popular, and consistently praised online language learning app, was used to evaluate learner autonomy and vocabulary learning efficiency of 134 postgraduate students. What's more, Google educational tools named Google Classroom and Google Form were put to use in the research of Borova *et al.* (2021) [32] who analyzed the advantages

Table 4. Mobile applications used in autonomous learning.

No.	Name	Main features	Frequency	Type	Percentage (approximate)
1	YouTube	<ul style="list-style-type: none"> • access to video resources • create personal videos • free comments on other users' videos 	1		
2	Facebook	<ul style="list-style-type: none"> • video clips • text messages and video calls • fanpages and closed-group function 	1		
3	WeChat	<ul style="list-style-type: none"> • text messages and video calls • community interaction • chat function and the multimodal feature • user-friendly interface and diverse functions 	2	Social media applications	67%
4	Text messaging	<ul style="list-style-type: none"> • two-way communication 	1		
5	WhatsApp	<ul style="list-style-type: none"> • voice messages • no time and place limitation • free and ubiquitous access to appropriate resources • interaction with peers and teacher • personalizing language learning process 	3		
6	Quizlet	<ul style="list-style-type: none"> • flashcards • personalized learning • interestingness 	2		
7	WebQuests	<ul style="list-style-type: none"> • self-assessment and progress tracking • flexible and portable • authentic material 	1	Educational applications	33%
8	Google Classroom Google Forms	<ul style="list-style-type: none"> • independent and flexible classroom environment • self-assessment, progress tracking, and feedback 	1		

of using Google educational tools for fostering students' learner autonomy, responsibility, and pedagogical engagement.

Through comparison between social media and educational applications, it is meaningful to see that there are several typical common features among these two types. Firstly, the provider and transmitter of accessible learning materials are different. These mobile applications provide a multitude of learning resources easily accessible to learners, enabling them to access and interact with English content whenever and wherever they want. Secondly, the creator of a flexible authentic learning environment is provided. This is in line with the research of Borova *et al.* (2021) [32] that students experienced a flexible and independent learning environment in Google Classroom to make them feel more responsible for their progress. Thirdly, breaker of time and space limitations are restricted. Mobile applications such as WhatsApp (Alzubi *et al.*, 2019 [28]; Alamer & Al-Khateeb, 2021 [30]) and WeChat (Wang & Jiang, 2021 [29]; Wu & Miller, 2019 [33]) have impressively attracted attention to enhance language acquisition due to the elimination of time and location boundaries. Fourthly, user-friendly interface and

personalization are created. WeChat has overtaken other instant messaging apps in the Chinese-speaking communities in popularity because of its simple user interface and multiple functions (Wu, 2018) [34]. Besides, WebQuests, as a web browser application, advocated personalized learning by giving a different role based on inquiry learning to develop self-direct learning (Zieni, 2019) [35].

Nevertheless, there are also some distinct differences between them. For social media applications, interpersonal and intergroup communication is a major bright spot. This is consistent with Aburezeq and Ishtaiwa (2013) [36] who noted that WhatsApp was able to encourage three different forms of communication including student-student, student-content, and student-instructor. Besides, text messaging, two-way communication by mobile phone, was applied as an instructional tool to improve learner autonomy at the Islamic Azad University-South Tehran Branch, Iran (Behforouz & Frumuselu, 2020) [21]. As to educational applications, it is designed to facilitate learning. Therefore, its key characteristics are self-assessment and progress tracking. They frequently contain examinations, evaluations, and quizzes that let students judge how well they are doing in various subject areas including grammar, vocabulary, and listening comprehension. Taking WebQuest as an example, an introduction, task, process, evaluation, and conclusion are all included in every WebQuest to encourage critical thinking at the levels of analysis, synthesis, and assessment (Zieni, 2019) [35].

Owing to these common features and distinct differences, teachers can set learning tasks and give feedback according to application functions meanwhile learners can also self-managing learning from their preferences. Generally speaking, social media and educational applications both play a significant role in developing learner autonomy for EFL learners at the tertiary level.

Research Question 2: For EFL Learners at the Tertiary Level, What Aspects of Learner Autonomy Are Affected by Mobile Applications?

In light of this question, psychological and technical versions of learner autonomy are mainly illustrated as shown in Table 5 and Figure 2. 7 studies focus on both two versions while 5 articles concern either of them.

In terms of the psychological version, confidence, as a typical feature of emotion part, is improved in 3 articles. EFL learners' responsibility for self-learning, as an element of belief part, is highly enhanced in 4 articles. More importantly, it

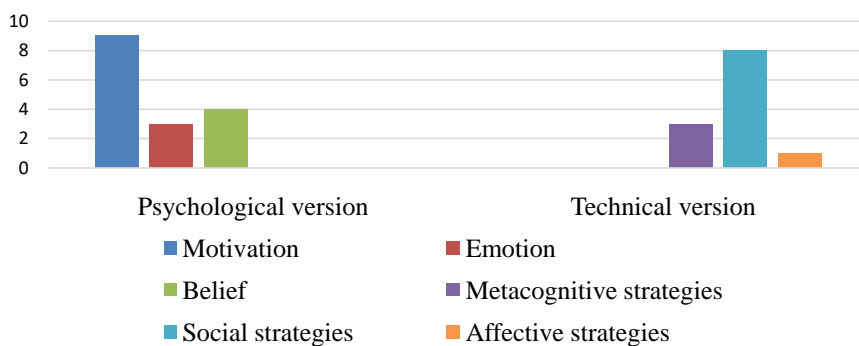


Figure 2. Two versions of learner autonomy affected by mobile applications.

Table 5. Aspects of learner autonomy affected by mobile applications in these studies.

No.	Author(s)	Mobile applications	Psychological perspective	Technical perspective
1	Trang (2022)	YouTube	confidence	peer collaboration
2	Inpeng and Nomnian (2022)	Facebook	confidence, motivation	self-management
3	Wang and Jiang (2021)	WeChat	motivation, responsibility	self-directed learning, interaction
4	Wu and Miller (2019)	WeChat	motivation	collaboration, peer interaction
5	Alamer and Al-Khateeb (2021)	WhatsApp	motivation, confidence	mutual collaboration, peer and teacher interaction
6	Alzubi <i>et al.</i> (2019)	Mobile technologies smartphone features and applications	motivation, belief, responsibility	
7	Alzubi <i>et al.</i> (2018)	Mobile technologies smartphone features and applications		social strategies
8	Behforouz and Frumuselu (2020)	Text messaging	motivation, responsibility	peer and teacher interaction
9	Zieni (2019)	WebQuests		inquiry-based skills, metacognitive skills, emotional intelligence skills
10	Daly (2022)	Quizlet	motivation	
11	Sato <i>et al.</i> (2020)	Quizlet	motivation	
12	Borova <i>et al.</i> (2021)	Google Forms & Google Classroom	motivation, responsibility	collaboration

is clear to see that motivation is the most influential variable for mobile-assisted autonomous learning. A total of 9 out of 12 studies discussed mobile application benefits in enhancing EFL learners' motivation.

Motivation, as an important psychological contributor to autonomous learning, is worth exploring how to improve based on mobile applications. Through synthesizing and comprising, it is found that WhatsApp, Facebook, WeChat, Text messaging, Google Forms & Google Classroom, and Quizlet are in favor of improving motivation by providing learners with fun for learning content (Alamer & Al-Khateeb, 2021) [30], freedom to interaction (Inpeng & Nomnian, 2022) [37], achievement and competition in peer and teacher assessment (Daly, 2022 [31]; Wang & Jiang, 2021 [29]).

Meanwhile, as to the technical version, emotional intelligence skills, belonging to affective strategies, are emphasized in 1 article. Metacognitive strategies including self-management and self-directed learning are applied in 3 articles. A total of 8 articles utilize social strategies especially collaboration and interaction to foster mobile-assisted autonomous learning.

When it refers to social strategies, interaction and collaboration are concerned in 4 articles respectively. Interaction in the target language and interpersonal communication are necessary for a successful second or foreign language acquisition process (Behforouz & Frumuselu, 2020) [21]. With regard to interaction, it is well practiced in four social media applications including Facebook, We-

Chat, WhatsApp, and Text messaging. This mainly gives credit to their common functions of instant messaging exchange and group chats which are lacking in education applications such as Quizlet and WebQuests. According to Jenó *et al.* (2018) [38], collaboration with students in an expanded learning environment can facilitate mobile learning. Similar findings were put forward in these four articles (Trang, 2022 [39]; Wu & Miller, 2019 [33]; Alamer & Al-Khateeb, 2021 [30]; Borova *et al.*, 2021 [32]) that mutual collaboration between peers is encouraged in mobile-assisted autonomous learning.

Research Question 3: *For EFL Learners at the Tertiary Level, What Language Skills Have Been Improved during Mobile-Assisted Autonomous Learning?*

As depicted in **Figure 3**, findings indicate that language skills are mainly illustrated into 5 aspects which are writing, reading, vocabulary, reading & listening, and EFL learning in general. The top three are writing, vocabulary, and EFL learning in general, respectively concerned in 3 articles. Reading skill is concerned in 2 articles. Then reading and listening skills are emphasized in 1 article at the same time. Through analyzing these articles, it is found that mobile-assist autonomous learning plays an important role in fostering language skills.

Nevertheless, the positive influence is different and limited. When it refers to vocabulary learning, the dimension of vocabulary learning based on Quizlet-assisted autonomy is quite different between the two articles. For the research of Daly (2022) [31], only the expressions of vocabulary are improved compared with paper lists. While according to Sato *et al.* (2020) [25], on account of combination with vocabulary learning strategies (VLS) such as oral rehearsals, associations, and mnemonics, vocabulary learning, on the whole, is more efficient than before. Besides, although WeChat truly has a positive effect on students' writing performance in terms of complicated and accurate syntax, it helps nothing with word collocation and paragraph coherence (Wang & Jiang, 2021) [29]. And in another research (Trang, 2022) [39], content review and comments given are two ways to practice writing based on YouTube video resources while several low-proficiency students resist posting comments due to afraid of making mistakes.

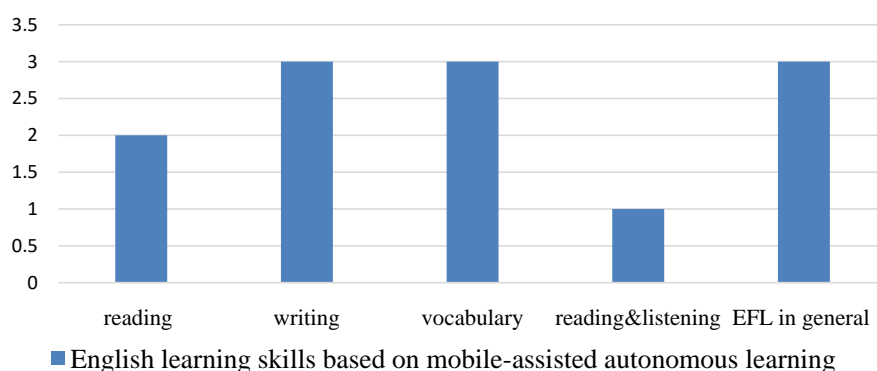


Figure 3. Language skills based on mobile-assisted autonomous learning.

4. Discussion

4.1. Multiple Mobile Applications Usage Simultaneously

Through analyzing the features of mobile applications in developing learner autonomy for EFL Learners at the tertiary level, it is worth mentioning that there is no one-fit-all mobile application for developing fully autonomous learners due to application limitations. As to this, one research (Borova *et al.*, 2021) [32] mentioned that students lack immediate feedback and are unable to recognize their mistakes right away when using Google Classroom. One drawback of another mobile application Quizlet is that it lacks application usage time when learners are doing study activities for vocabulary learning (Daly, 2022) [31]. Besides, the instability of the internet leads to time-consuming and distraction for learners (Inpeng & Nomnian, 2022) [37]. These concerns are consistent with Li and Bonk (2023) [40] who claimed that a single MALL program like Duolingo is insufficient to master all essential language domains.

Hence, for mobile application designers, overall consideration for function maturation to enhance the availability of language learning is indispensable. But it doesn't happen overnight. Depending on the present situation, it is the most available way to attempt multiple mobile applications simultaneously by functional complementarity for autonomous learning.

4.2. Digital Literacy Development for Both EFL Learners and Teachers

The literature review shows that specialized training before using these mobile applications is beneficiary to EFL learners. They should focus more on digital literacy development which is one obstacle to technology integration in academic courses (Blau *et al.*, 2020) [41]. In a mobile-based learning environment, although learners are encouraged to use these mobile applications in their own way, some students prefer to use paper lists rather than mobile applications like Quizlet for their vocabulary learning due to unfamiliar with their academic use of them (Sato *et al.*, 2020) [25].

In addition, it is a worthy ability for teachers to cultivate competence in the critical evaluation of digital tools (Godwin-Jones, 2019) [42]. As facilitators and moderators of learner autonomy, teachers should be rigorous in mobile application selection. Therefore, it is essential to seriously consider trying multiple mobile application usage simultaneously based on digital literacy development for both EFL learners and teachers to satisfy different demands in developing learner autonomy.

4.3. Pedagogical Implications on Mobile-Assisted Autonomous Learning

As far as it's concerned, mobile applications, as a contributor to interaction and collaboration due to their communicative functions, have enhanced EFL learners' motivation in autonomous learning. In turn, with the increasing motivation

in autonomous learning, they prefer to spontaneously communicate with each other in English. Such findings suggest that social strategies should be emphasized and aligned with features of mobile applications to foster EFL learners' autonomous learning.

In addition, although mobile applications as supplementary online learning tools offer plenty of chances to facilitate autonomous learning as a ubiquitous friend, the effects vary from person to person owing to the different language proficiency levels and various attention spans of EFL learners. Therefore, the different capacities of learning control should be taken into consideration when teachers underdo the course design. Mobile-assisted instruction and supervision can't be neglected in the process of autonomous learning.

4.4. Balanced Language Skills Cultivation for EFL Learners

Based on the findings above, it seems that not all language skills are balanced and developed. It is thought-provoking that speaking skill is given the least attention in mobile-assisted autonomous EFL learning. Speaking skill, as the most challenging skill for EFL learners, is highly required in this competitive world (Vellayan *et al.*, 2021) [43]. In terms of video call and video voice functions of some mobile applications, there are more chances for EFL learners to speak English.

However, the reality is not satisfying with new issues arising. When learners stay in a virtual communication environment with non-familiar persons, they prefer to type with each other than speak because of embarrassment. In addition, even if they are familiar with each other, it is not feasible to receive immediate feedback or assessment from teachers and peers in an autonomous mobile learning environment when they speak to each other. As a result, for further research, cogitative group division and instant feedback should be considered for teachers to improve the speaking skills of EFL learners in autonomous learning.

5. Conclusions

To analyze the effectiveness of mobile applications in autonomous English learning and explore what aspects of learner autonomy have been developed for EFL learners at the tertiary level, 12 related articles are reviewed from features of mobile applications, aspects of learner autonomy, and developed language skills. The findings of the review show that mobile applications, especially social media and educational applications have already proved to be quite beneficial in autonomous learning for EFL learners at the tertiary level. They play multiple roles in autonomous learning owing to features like provider and transmitter of accessible learning materials, creator of a flexible authentic learning environment, breaker of time and space limitation, user-friendly interface, and personalization. All these features could offer opportunities for students to interact and collaborate with others to enhance their psychological version of autonomy including motivation and confidence as well as responsibility in language learning. Meanwhile, it is acknowledged that the appropriate use of mobile applications can en-

hance learners' language skills, particularly writing, reading, and vocabulary.

However, this review also reveals some concerns such as inadequate preparation of mobile applications, unbalanced developed language skills, and uneven enhancement of learner autonomy due to different language proficiency and attention span. For further research, both teachers' and learners' digital literacy are encouraged to develop for multiple mobile application usage. Besides, more research should be conducted on improving English speaking skills with social strategies as well as metacognitive and affective strategies from the technical version of autonomous learning.

Furthermore, this literature review is not exempt from several limitations, which include inadequate searching articles, limited searching databases, and a manual selection process. For future research, more articles from more databases could be analyzed to generate more comprehensive and reliable information for the concerned questions. Nevertheless, the findings and implications have pointed out the direction to develop learner autonomy based on mobile applications.

Acknowledgements

This study was supported by Scientific Research Project of Chongqing Youth Vocational & Technical College (Research on the Practical Application of Social Media in Vocational College English Teaching in the Mobile Internet Era CQY2022JXY01).

Conflicts of Interest

The authors declare no conflicts of interest.

References

- [1] Fredrick, L. and Karthikeyan, J. (2018) Exploring the Reach of Mobile-Assisted Language Learning among Mechanical Engineering Students. *International Journal of Mechanical Engineering and Technology*, **9**, 738-742.
- [2] Puebla, C., Fievet, T., Tsopanidi, M. and Clahsen, H. (2021) Mobile-Assisted Language Learning in Older Adults: Chances and Challenges. *ReCALL*, **34**, 169-184. <https://doi.org/10.1017/S0958344021000276>
- [3] Alamer, A. (2015) The Role of EFL Learners' Motivation in Mobile Language Learning. *First International Conference on Theory and Practice (ICTO-2015)*. Asia Pacific Institute of Advanced Research (APIAR), Adelaide. <https://www.apiar.org.au>
- [4] Shadiev, R., Liu, T. and Hwang, W. (2019) Review of Research on Mobile-Assisted Language Learning in Familiar, Authentic Environments. *British Journal of Educational Technology*, **51**, 709-720. <https://doi.org/10.1111/bjet.12839>
- [5] Loewen, S., Crowther, D., Isbell, D.R., Kim, K.M., Maloney, J., Miller, Z.F. and Rawal, H. (2019) Mobile-Assisted Language Learning: A Duolingo Case Study. *ReCALL*, **31**, 293-311. <https://doi.org/10.1017/S0958344019000065>
- [6] Chen, C.M., Liu, H. and Huang, H.B. (2019) Effects of a Mobile Game-Based English Vocabulary Learning App on Learners' Perceptions and Learning Performance: A Case Study of Taiwanese EFL Learners. *ReCALL*, **31**, 170-188. <https://doi.org/10.1017/S0958344018000228>

- [7] Kukulska-Hulme, A. (2016) Mobile Assistance in Language Learning: A Critical Appraisal. In: Palalas, A. and Ally, M., Eds., *The International Handbook of Mobile-Assisted Language Learning*, China Central Radio & TV University Press, Beijing, 138-160.
- [8] Chang, L.Y.H. (2020) Taiwanese EFL Language Teachers' Beliefs and Actual Practices Related to Learner Autonomy. *TESL-EJ: The Electronic Journal for English as a Second Language*, **23**, 1-15.
<https://tesl-ej.org/wordpress/issues/volume23/ej92/ej92a9>
- [9] Tayjasanant, C. and Suraratdecha, S. (2016) Thai EFL Teachers and Learners' Beliefs and Readiness for Autonomous Learning. *3L: Southeast Asian Journal of English Language Studies*, **22**, 153-169. <http://ejournal.ukm.my/3l/issue/view/872>
<https://doi.org/10.17576/3L-2016-2203-11>
- [10] Holec, H. (1981) *Foreign Language Learning*. Pergamon Press, Oxford.
- [11] Benson, P. (1997) The Philosophy and Politics of Learner Autonomy. In: Benson, P. and Voller, P., Eds., *Autonomy and Independence in Language Learning*, Longman, London.
- [12] Cotterall, S. (1995) Readiness for Autonomy: Investigating Learner Beliefs. *System*, **23**, 195-205. [https://doi.org/10.1016/0346-251X\(95\)00008-8](https://doi.org/10.1016/0346-251X(95)00008-8)
- [13] Little, D. (1991) *Autonomy: Definitions, Issues, and Problems*. Authentik, Dublin.
- [14] Oxford, R.L. (2003) Toward a More Systematic Model of L2 Learner Autonomy. In: Palfreyman, D. and Smith, R.C., Eds., *Learner Autonomy across Cultures*, Palgrave Macmillan, London, 75-91. https://doi.org/10.1057/9780230504684_5
- [15] Pennycook, A. (1997) Cultural Alternatives and Autonomy. In: Benson, P. and Voller, P., Eds., *Autonomy and Independence in Language Learning*, Longman, London, 35-53. <https://doi.org/10.4324/9781315842172-4>
- [16] O'Malley, J.M. and Chamot, A.U. (1990) *Learning Strategies in Second Language Acquisition*. Cambridge University Press, Cambridge.
<https://doi.org/10.1017/CBO9781139524490>
- [17] Oxford, R.L. (1990) *Language Learning Strategies: What Every Teacher Should Know*. Newbury House, Rowley.
- [18] Benson, P. (2013) *Teaching and Researching: Autonomy in Language Learning*. Routledge, London. <https://doi.org/10.4324/9781315833767>
- [19] Tuan, D.M. (2021) Learner Autonomy in English Language Learning: Vietnamese EFL Learners' Perceptions and Practices. *Indonesian Journal of Applied Linguistics*, **11**, 307-317. <https://doi.org/10.17509/ijal.v11i2.29605>
- [20] Xu, J. (2014) The Current Situation and Reflection on Chinese College Students' Autonomous English Learning Abilities. *Language and Education*, **2**, 2-7. (In Chinese)
- [21] Behforouz, B. and Frumuselu, A.D. (2020) The Impact of Text Messaging as an Instructional Tool to Enhance Learner Autonomy and Perception. *International Journal of Learning, Teaching and Educational Research*, **19**, 184-202.
<https://doi.org/10.26803/ijlter.19.11.11>
- [22] Alzubi, A.A.F. (2019) Smartphone-Mediated Language Learning Strategies and Learner Autonomy among Pre-University Learners in EFL Reading Context. *Journal of Humanities and Social Sciences Studies (JHSSS)*, **1**, 49-63.
- [23] Fabian, K., Topping, K.J. and Barron, I.G. (2018) Using Mobile Technologies for Mathematics: Effects on Student Attitudes and Achievement. *Educational Technology Research and Development*, **66**, 1119-1139.

- <https://doi.org/10.1007/s11423-018-9580-3>
- [24] Metruk, R. (2020) EFL Learners' Perspectives on the Use of Smartphones in Higher Education Settings in Slovakia. *Electronic Journal of E-Learning*, **18**, 537-549. <https://doi.org/10.34190/JEL.18.6.006>
- [25] Sato, T., Murase, F. and Burden, T. (2020) An Empirical Study on Vocabulary Recall and Learner Autonomy through Mobile Assisted Language Learning in Blended Learning Settings. *CALICO Journal*, **37**, 254-276. <https://doi.org/10.1558/cj.40436>
- [26] Singh, V.K., Singh, P., Karmakar, M., Leta, J. and Mayr, P. (2021) The Journal Coverage of Web of Science, Scopus and Dimensions: A Comparative Analysis. *Scientometrics*, **126**, 5113-5142. <https://doi.org/10.1007/s11192-021-03948-5>
- [27] Alzubi, A.A.F. and Singh, M.K.M. (2018) The Impact of Social Strategies through Smartphones on the Saudi Learners' Socio-Cultural Autonomy in EFL Reading Context. *International Electronic Journal of Elementary Education*, **11**, 31-40. <https://doi.org/10.26822/iejee.2018143958>
- [28] Alzubi, A.A.F., Singh, M.K.A.M. and Hazaea, A.N. (2019) Investigating Reading Learning Strategies through Smartphones on Saudi Learners' Psychological Autonomy in Reading Context. *International Journal of Instruction*, **12**, 99-114. <https://doi.org/10.29333/iji.2019.1227a>
- [29] Wang, W. and Jiang, L. (2021) Writing on WeChat Moments: Impact on Writing Performance and Learner Autonomy. *Computer Assisted Language Learning*. <https://doi.org/10.1080/09588221.2021.1976799>
- [30] Alamer, A. and Al-Khateeb, A. (2021) Effects of Using the WhatsApp Application on Language Learners' Motivation: A Controlled Investigation Using Structural Equation Modeling. *Computer Assisted Language Learning*, **36**, 149-175. <https://doi.org/10.1080/09588221.2021.1903042>
- [31] Daly, N.P. (2022) Investigating Learner Autonomy and Vocabulary Learning Efficiency with MALL. *Language Learning & Technology*, **26**, 1-30.
- [32] Borova, T., Chekhratova, O., Marchuk, A., Pohorielova, T. and Zakharova, A. (2021) Fostering Students' Responsibility and Learner Autonomy by Using Google Educational Tools. *Revista Romaneasca Pentru Educatie Multidimensionala*, **13**, 73-94. <https://doi.org/10.18662/rrem/13.3/441>
- [33] Wu, J.G. and Miller, L. (2019) Raising Native Cultural Awareness through WeChat: A Case Study with Chinese EFL Students. *Computer Assisted Language Learning*, **34**, 552-582. <https://doi.org/10.1080/09588221.2019.1629962>
- [34] Wu, J.G. (2018) Mobile Collaborative Learning in a Chinese Tertiary EFL Context. *TESL-EJ: The Electronic Journal for English as a Second Language*, **22**, 1-15.
- [35] Zieni, H.A. (2019) The Effect of Mobile Learning on Learner Autonomy: A Suggested Measurement Tool to Assess the Development of Learner Autonomy. *The Journal of Asia TEFL*, **16**, 1020-1031. <https://doi.org/10.18823/asiatefl.2019.16.3.19.1020>
- [36] Aburezeq, I.M. and Ishtaiwa, F.F. (2013) The Impact of WhatsApp on Interaction in an Arabic Language Teaching Course. *International Journal of Arts & Sciences*, **6**, 165-180.
- [37] Inpeng, S. and Nomnian, S. (2022) Facebook as a Promotional Tool for Learner Autonomy: Thai Pre-Service EFL Teachers' Voices. *TEFLIN Journal—A Publication on the Teaching and Learning of English*, **33**, 292-309. <https://doi.org/10.15639/teflinjournal.v33i2/292-309>
- [38] Jenö, L.M., Adachi, P.J.C., Grytnes, J.A., Vandvik, V. and Deci, E.L. (2018) The Effects

-
- of M-Learning on Motivation, Achievement, and Well-Being: A Self-Determination Theory Approach. *British Journal of Educational Technology*, **50**, 669-683. <https://doi.org/10.1111/bjet.12657>
- [39] Trang, N.M. (2022) Using YouTube Videos to Enhance Learner Autonomy in Writing: A Qualitative Research Design. *Theory and Practice in Language Studies*, **12**, 36-45. <https://doi.org/10.17507/tpls.1201.05>
- [40] Li, Z. and Bonk, C.J. (2023) Self-Directed Language Learning with Duolingo in an Out-of-Class Context. *Computer Assisted Language Learning*. <https://doi.org/10.1080/09588221.2023.2206874>
- [41] Blau, I., Shamir-Inbal, T. and Avdiel, O. (2020) How Does the Pedagogical Design of a Technology-Enhanced Collaborative Academic Course Promote Digital Literacies, Self-Regulation, and Perceived Learning of Students? *The Internet and Higher Education*, **45**, Article ID: 100722. <https://doi.org/10.1016/j.iheduc.2019.100722>
- [42] Godwin-Jones, R. (2019) Riding the Digital Wilds: Learner Autonomy and Informal Language Learning. *Language Learning & Technology*, **23**, 8-25.
- [43] Vellayan, G., et al. (2021) A Review of Studies on Cooperative Learning Strategy to Improve ESL Students' Speaking Skills. *Turkish Journal of Computer and Mathematics Education (TURCOMAT)*, **12**, 63-68.