

# Mandarin Students' Perceptions of Smartphone Applications in Mandarin Learning

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**Abstract** The brilliant advancement of mobile technologies provides a vivid instructional approach which suits the millennial students where learning happens ubiquitously. Therefore, awareness that mobile-assisted language learning (MALL) encourages personalized learning is the focus. Smartphone, the most excellent creation has impressed everyone, and it offers enormous potential for integration into language learning. Smartphone applications (SA) enable students to learn nowhere, in the class or out of the formal class. However, the way of students perceive SA as the Mandarin learning tools have not yet explored broadly. Thus, this preliminary study aims to examine Mandarin students' perceptions of SA along with its usability, effectiveness, and satisfaction and the correlations of gender, course, and activities via SA against the items mentioned. A quantitative method was used through questionnaires distribution for data collection. 79 of undergraduates from an east coast university were chosen as the respondents to answer the survey. The survey was conducted in the 10th week of a 14 weeks Mandarin course. The collected data were then analysed using SPSS for the descriptive statistics. Two types of smartphone applications included dictionary based and teaching and learning based were identified. The statistics show that all the respondents consented that learning Mandarin via SA has influenced their language performance; task accomplishment and personal study positively. In addition, the students were engaging, satisfied and willing to continue using smartphones in their study. All in all, SA is a potential tool for MALL. However, students need guidance in ensuring the productiveness of SA in MALL.

**Keywords** Mobile-Assisted Language Learning, Smartphone Applications, Mandarin as a Foreign Language

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## 1. Introduction

The world now is wireless connected. This brilliant technology and variety of mobile-device innovations have dominated human's life especially in the field of education. Previous research has shown plenty of alternative language learning tools are invented using mobile technology. Mobile devices offer the features of portability, social connectivity, context sensitivity, and individuality and all these characteristics might not be provided by using desktop computers. These advanced mobile technologies have made learning movable, real-time, collaborative, and seamless (Kukulka-Hulme, 2009; Wong & Looi, 2011). Accordingly, mobile devices have changed foreign language instructional methods and learning strategies (Abdous, Camarena, & Facer, 2009). Bergman (2012) and Fryer (2013) affirmed that language learning using mobile devices leaves a positive impact on students' test scores and behaviour. Numerous studies contended the use of technology in Mandarin language learning. They are Tian, Lv, Wang, Wang, Luo, Kam & Canny, 2010, Niu, Liu, Lin, Zhu, & Wang, (2014); Chang, Lan, Chang, & Sung, (2010) and they agreed that mobile technology affects remarkably on education, especially in learning foreign languages.

Today, smartphone is the latest invention in mobile technology which has gained popularity and attention of academia. Learning and communicating can happen ubiquitously in the hands of instructors and students. The influences proved by Bothun (2011), the mobile consumers will increase in coming two years as the apps will become more excellent. People use a smartphone for educational and non-educational purposes like managing

their information, reading, surfing the internet, communicating, doing research and, messaging and (Jubien, 2013). Learning via these mobile technologies is defined as mobile learning (m-learning) whereby learners can receive material anywhere and anytime through technology (Turkle, 2011). Guy (2009) interpreted it as electronic learning (e-learning) through mobile computational devices. Brown (2008) concedes that m-learning includes strategies, practices, tools, applications, and resources that support learning anywhere and anytime. Kee and Samsudin, (2014) said that mobile-technology helps teenagers perform learning efficiently. Students are called 'Digital natives' or 'net generation' as they are technological friendly and digitally fluent. Nowadays, younger generations spend most of their time on these devices for socializing or entertainment (Ally, 2009). Therefore, any tool that eases student in accessing languages will help them in their learning progress (Reinders and Cho, 2010).

In Malaysia, there is also a large board of study on technology usage in teaching Mandarin. However, the inability to converse Mandarin is caused by the traditional teaching method. The educators are dedicated and motivated in delivering materials to the students in short given time however that students are always lack of time on practicing their oral skills. Additionally, majority of Mandarin teachers in Malaysia still use traditional teaching methods, which focuses on translating texts and teaching grammar in class. All in all, instructors are focused more time in explaining and giving information about the language and correcting the learners' pronunciations well than providing chances for the learners to practice their speaking.

MALL is an approach that teacher can imply in this millennium era to cater students' learning styles and needs. Sandberg, Maris, and De Geus, (2011) as well as Chang et al., (2010) affirmed that traditional integration learning with the inevitable advance of technology has made the instructional process better either in both formal and informal setting. With m-learning, learners and teachers have more chances to practice the target language 'anywhere and anytime'. Although there are numerous studies, suggest benefits in using advanced technologies in language learning, the impact of mobile phones especially smartphones in learning Mandarin has not been explored widely (Chua, Ahmad Tajuddin & Goh, 2017). Most of the students do not know for what purpose they are using their mobile phone (Jubien, 2013). They should be guided to be benefited the portability, social interactivity, context sensitivity, and connectivity; of the mobile phone in their learning. Thus, this study would like to find out the respondents' experience with mobile devices and their smartphone usage in learning Mandarin. In addition, participants' perceptions of the effectiveness and satisfaction of using smartphones for Mandarin

language learning are also being investigated.

## 2. Literature Review

The purpose of this section is to provide a review of past research efforts related to Mobile-Assisted Language Learning (MALL) in foreign language. A review of other relevant research study such as MALL in learning Mandarin is also provided. The review is organized chronologically to offer insight to how past research efforts have laid the groundwork for subsequent studies, including the present research effort. The review is detailed so that the present research effort can be properly tailored to add to the present body of literature as well as to justify the scope and direction of the present research effort.

### 2.1. Mobile-Assisted Language Learning (MALL) in Foreign Language

In the last few decades, Kizito (2012); Chanprasert & Han (2013) have discussed the benefit of mobile phones in developing language skills. The use of short messaging service (SMS) could enlarge language learners' vocabulary. Meanwhile, the integrating tasks which focus on meaning can engage students in learning a foreign language should not be abandoned. Also, SMS can be used to motivate students to learn and enhance their vocabulary. Besides, learners are able to exploit SMS and other voice communication apps to practice new vocabulary via role-plays and short dialogues. This MALL approaches improve the effectiveness of group learning and enhance the quality of interaction during language learning as it offers features of shared tasks and real-time communication. Creating meaningful environment for students from different countries to practice their language and to get feedback instantaneously is still deemed to be vital.

### 2.2. MALL in Learning Mandarin

According to the most recent data, the number of smartphones will be exceeded to 1 billion and it is expected to double in the next three years in world-wide use (Yang, 2012). Plenty efforts have been made to cater the need of Mandarin language learners in communicating in tonal language around the world. An easy-to-use Chinese text entry is used to sustain the high penetration of mobile phones and SMS use among Chinese users. In addition, they have successfully invented two new solutions for Chinese pinyin text entry with a rotator as an input device. Also, Al-Mekhlafi, Hu & Zheng (2009) initiated Context-Aware Mobile Chinese Language Learning (CAMCLL) for international students via mobile phone. It is to help the students as a service guide when they are out of school for their real-world Mandarin

practice. CAMCLL benefits the students by informing them, via their mobile phones with proper sentences based on the contexts of time, location, activity, and learner's level. It is discovered that this approach has enhanced the Chinese language learning efficiency and effects for international students. The research shows that Chinese text entry has eased Mandarin user in searching all related Mandarin materials. How this Mandarin pinyin typing skill can enhance students' Mandarin is an interesting approach to enhance students' Mandarin learning.

Plenty software programs have been invented to fulfil the Mandarin language users' needs. Advancement of wireless and mobile technology has introduced a large number of programs or mobile applications in learning foreign languages. Mobile learning games (Tian et al., 2010) help to enrich learners' vocabulary and improve their knowledge of Chinese characters. The previous studies indicate that m-learning games can play an essential role in the learning Mandarin. Students can be guided to use the available attractive apps via smartphone which enables learning nowhere and anytime.

Learner-created content (Wong, Chin, Tan & Liu, 2010) in m-learning provides great potential of transforming language learning into a real learning process. Some students were assigned to take photos in real-life in the study then they are asked to construct sentences with the prepositions or idioms given using mobile devices. The result showed that the students were more active in the classroom or online discussion for their grammatical constructions.

From another perspective, several studies reported on attitudes towards using mobile devices in Mandarin learning (Wang and Smith's, 2013). Stockwell's (2010) and Osman and Chung's (2011) study combined mobile text messages with Wiki to promote cooperative learning. Stockwell (2010), based on the frequency of students' logging in to different systems, found that 60% of the 175 participants had never completed any tasks by using mobile phones with three participants (1.7%) completed all the vocabulary learning activities through mobile phones. Stockwell concluded that the main reason could be using mobile devices takes more time to complete a task. Similarly, Osman and Chung (2011) found that the students were not fond of using Wiki probably because few students were familiar with Wiki. On the other hand, the study of mobile reading and the acquisition of grammar revealed that the participants lacked any motivation unless the learning outcomes have a role in their grades or credits (Wang and Smith, 2013). To sum up, the three main reasons why students tend to be unwilling to learn Mandarin by mobile devices are: (1) the cost of employing the system discourages the students from learning; (2) students are not familiar with the mobile learning system; and (3) students lack motivation. Osman and Chung (2011) seemed to indicate that students would be willing to use the system if they were familiar with it.

### 3. Methodology

In term of MALL, instructors and learners are given a dominant way to practice the target language 'anywhere and anytime' (Geddes, 2004). No doubt, the effectiveness of smartphones in education can enhance students learning and performance. With these purposes in mind, this study utilized a quantitative research method in which the data was gathered through an adapted questionnaire (Chen, 2013). The survey comprised 24 questions where the first part is to find out the respondents' experience with mobile devices and their smartphone usage in learning Mandarin. The second part was regarding participants' perceptions of the effectiveness and satisfaction of using smartphones for Mandarin language learning.

#### 3.1. Procedures

Recognizing the effectiveness of smartphones, this study intends to explore the students' perceptions, experiences and satisfaction regarding the use of smartphones in learning Mandarin. The type of smartphone and its applications are carefully explored. 79 undergraduates who are undertaking Mandarin language course students from a university at the East Malaysia were selected using purposive sampling technique. This technique is chosen as the sample was of being a convenience and they were accessible to the instructor at the same time as the researcher (Friedman, 2012). Participants were 67 females and 12 males from two courses: 20 students are from Communicative Mandarin and 59 of them are Mandarin Level 1 students. In pilot study, 30 Mandarin students as the relevant population from a nearby university were chosen to answer the survey. The Cronbach's Alpha calculated was 0.917 and, this has fulfilled the standard of reliability. Earlier, all participants were asked to download some Mandarin learning applications using their smartphones, so they can use them in and outside of the class. The questionnaires were then distributed to all the Mandarin students at the 10<sup>th</sup> week of learning. The questionnaire was distributed to the students in week 10 of the semester after they have some knowledge about Mandarin and smartphone applications. After they have answered the survey, the students are asked to screenshot all the apps they have been downloaded and using, then send them to researcher via their smartphones. From the actual answers given, instructors can adjust the teaching strategy to make the instructional process more effective and last longer.

### 4. Result

This section will present and discuss the results obtained from this research. It consists of experiences of MALL, smartphone applications, smartphone applications

in language learning and usability, effectiveness and satisfaction of SA.

#### 4.1. Experiences of MALL

To what extent the smartphone applications usage has affected students learning experiences was shown in figure 1.

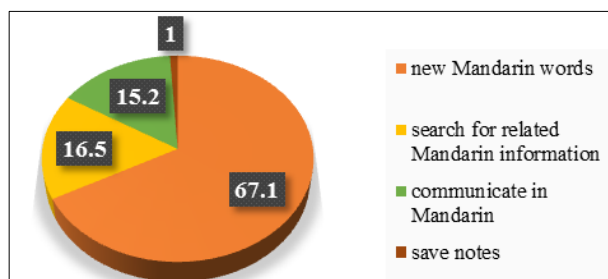


Figure 1. Smartphone Usage (in %)

Figure 1 above explains the different usages of smartphones reported by the students. All the undergraduates in the classroom owned a smartphone, and all of them claimed that they had used their smartphones to learn Mandarin. Majority of the respondents used a smartphone to look up for new Mandarin words (67.1%) since the convenience of m-learning helped them to personalize their learning activities. Meanwhile, surfing

related information about Mandarin (16.5%) and communicating with others using Mandarin (15.2%) were among the common usage of smartphones.

#### 4.2. Smartphone Applications

The participants were asked to list down the smartphone applications that they have downloaded, which facilitate them in learning Mandarin. The responses were overwhelming since the students used more than two apps each to improve their proficiency. Some of the most common Mandarin applications are Pleco, 中 ENG Dictionary, Hello Chinese, Chinese, Talking Chinese, Chinese Lite, Pinyin, 中文 English, CN Phrase, Survival Kit, 24 HOURS Speak Chinese, A 文, CHINESE 字典, Chinese Skill, Learn Chinese Chinese, Learn Chinese, 英汉 English Chinese, 1200 字, and G 文. All the applications were free, and they came together with the audio function which was indicated by the picture of a speaker.

There were two types of applications identified. Firstly, dictionary-based (DB) which shows in Table 1 included Pleco, 中 ENG Dictionary, 中文 English, A 文, CHINESE 字典, 英汉 English Chinese.; and secondly, teaching and learning applications (TLA) which produce more Mandarin sentences like HelloChinese, Survival Kit, ChineseSkill, Tones, and others as presented in Table 2.

Table 1. Dictionary Based Smartphone Applications (in %)

SA	%	SA	%	SA	%
Pleco	42%	Google 文 Translate	4%	Chinese Dictionary	1%
中 Eng Dictionary	34%	eKamus 马来文字典	4%	English To Chinese...	1%
中文 English Dictionary	9%	English Chinese	3%	Chinese-English	1%
CHINESE 字典 Dict Box	4%	Kamus Mandarin	4%	A 文	1%
Chinese Mandarin Translate	3%	中文 Hanping Lite	4%	英汉 English Chinese	1%
快词英汉 词典	4%	Chinese Dictionary	1%	Malay to Chinese	1%

Table 2. Teaching and Learning Smartphone Applications (in %)

SA	%	SA	%	SA	%
Chineseskill	32%	Mandarin	1%	Mandarin Quizlet	3%
Survival Kit	28%	Learn&Play	3%	Pinyin Lite	3%
HelloChinese	20%	10000 Mandarin	1%	Chinese Pinyin	1%
Tone	5%	Number Trainer	1%	Memrise	4%
Chinese	14%	rainchinese	1%	Learn...	3%
Words	11%	Pinyin	4%	Listen	3%
Pinyin	11%	Chinese...	4%	Speak Free	1%
Chinese	3%	Easy Pinyin(En)	1%	Chinese-English	3%
巧宝识字	3%	Chinese Artword	1%	Hello Words	1%
Chinese Pinyin	1%	Easy Talk Chinese	3%	Chinese Flashcards	1%
Chinese...	1%	Strokes...	5%	Chinese Lite	10%
Learn Chinese	6%	LearnChinese	1%	Talking...	1%
Pin Pin	1%	Talking Translator	1%	Writer	4%
Chinese Primer	3%	Laoshi	16%	CN Phrase	3%

Table 1 shows there are 18 types of dictionary-based smartphone applications (DB) have been downloaded by the students to ease them in learning Mandarin.

Meanwhile, Table 2 shows there are 42 kinds of teaching and learning smartphone applications (TLA) have downloaded by the respondents during the ten weeks lesson. The TLA has the audio function, pictures, songs, and games.

All in all, there are numerous Mandarin smartphone applications which are free and charged which are very helpful in learning Mandarin. The apps will help the students to get the meaning of the Mandarin words, phrases and sentences, listen and practice in pronouncing them anytime and everywhere, whether they are in or out of the classroom. The respondents of this research have successfully installed and used more than two smartphone applications which including DBA and TLA on their smartphones. The students' preferences in using DBA are: Pleco Chinese Dictionary (42%) and, Chinese English Dictionary Bravolol Limited (34%). The students like Pleco and Bravolol dictionary because they are free and can be used offline. Most of them agreed that Pleco is the best DBA since there are many example sentences given in explaining each word and the words are coloured. Besides, the audio function enables participants listen and

practice the correct pronunciation of Mandarin words. While TLA smartphone applications are: ChineseSkill (32%), Survival Kit (28%) and HelloChinese (20%). Since they are easy to download and there are many attractive and interesting activities in learning Mandarin, so they were not able to express their preferences on which apps, either DBA or TLA, have been more helpful in their learning of Mandarin. Both applications have different functions in improving their proficiency.

### 4.3. Smartphone Applications in Language Learning

From the study, students' experiences regarding the smartphone applications usage were shown in figure 2.

Since the students were introduced to the different Mandarin applications of smartphone early of the semester, the students were more confident and familiar with them as they were easily accessible (27.8%) and the variety of interesting features made it easy for them to learn new Mandarin words (62%). However, some of the students informed that the smartphones can be useful, but it depends on the Mandarin smartphone applications (5.1%) and user (5.1%). Figure 2 shows all the participants consented that smartphone applications are beneficial for helping them to learn Mandarin.

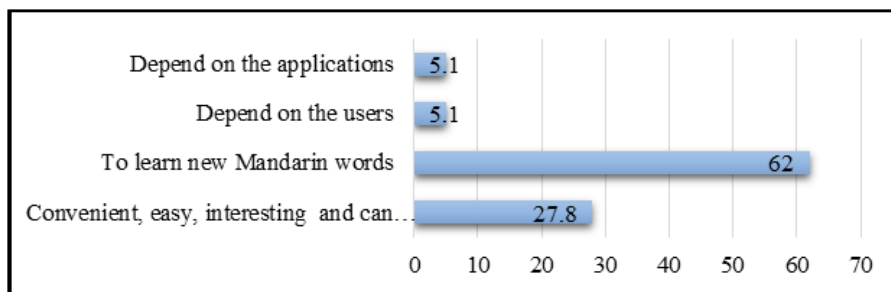


Figure 2. The usefulness of smartphone applications (in %)

#### 4.4. Usability, Effectiveness, and Satisfaction of SA

A useful way to approach the evaluation of MALL technology is to address its usability, effectiveness, and satisfaction along with the learners' attitude (Azar & Nasiri, 2014). Thus, this paper also attempted to assess undergraduates' attitudes towards SA in learning Mandarin. The details were shown in table 3.

Table 3 shows the items of Mandarin language performance (question 1: assist Mandarin language learning; question 2: give greater control of Mandarin learning; question 5: increase outcome in learning Mandarin, and question 6: improve performance in mandarin), tasks accomplishment (question 3: more tasks done and 7: quicker manner), and students' learning (question 4: support their critical aspects; question 8: enhance their study effectiveness; question 9: ease their study, and question 10: be useful in their study).

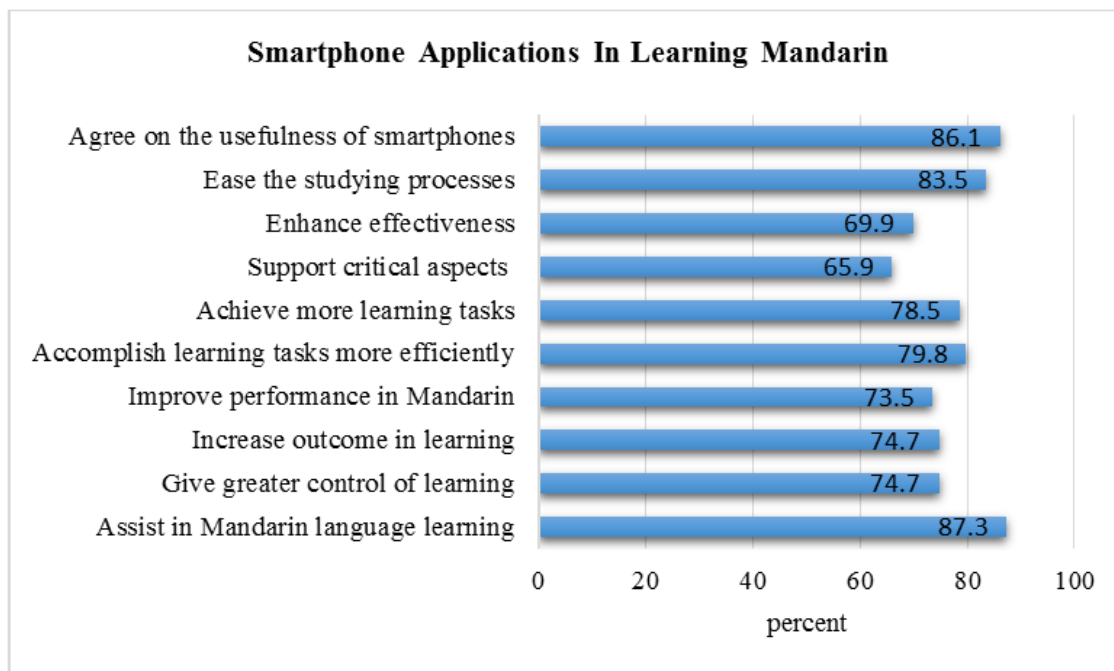
**Table 3.** Item of Mandarin Language Performance, Task Accomplishment and Students' Learning

Mandarin Language Performance	
Question 1	assist Mandarin language learning
Question 2	give greater control of Mandarin learning; question
Question 5	Increase outcome in learning Mandarin
Question 6	improve performance in mandarin
Task Accomplishment	
Question 3:	more tasks done
Question 7	quicker manner
Students' Learning	
Question 4	support their critical aspects
Question 8	enhance their study effectiveness
Question 9	ease their study
Question 10	be useful in their study

The answers given in Figure 3 are regarding SA in learning Mandarin. 87.3% respondents agreed that the smartphones' portability and accessibility have facilitated them in searching and receiving plenty of Mandarin learning material and they can control over their learning anywhere and anytime and at their own convenient pace.

Additionally, the advance features of smartphones increase learning engagement as 74.7% of respondents agreed that smartphone applications increased their learning outcomes as well as improved their Mandarin language performance (73.5%). These applications not only allow autonomy, but also scaffold their learning. When they were given different tasks, respondents concurred that apps supported in locating and practicing critical aspects of language learning (65.9%) and they sought for materials and practice their Mandarin during their free time, which confirmed that the applications enhance their effectiveness in learning (83.5%) and to sum up using these apps, they could complete more learning tasks in a short time (78.5%). Students' answers in Figure 3 can be explained further on the term of language performances, task accomplishment, and students' learning.

In term of language performance which shown in Figure 3, more than 80% (86.1) respondents agreed that smartphone helped them a lot and gave them (74.7%) greater control over their learning of Mandarin language since the smartphones' portability and accessibility have facilitated them in searching and receiving plenty of Mandarin learning material anywhere and anytime and at their own convenient pace. This shows that with the help of SA, the respondents are taking charge on their own learning and this can be a tool to promote autonomy, especially with issues of large class sizes or exam-oriented teaching. Additionally, the technology of smartphones enables the Mandarin applications to have the audio function, pictures and games, which can increase learning engagement. All these features have eased them in their language learning since 74.7% of respondents agreed that smartphone applications increased their learning outcomes as well as improved their Mandarin language performance (73.5%). From the result, the significant differences for language performance is 0.36, which more than  $\alpha \geq 0.05$ ; therefore, all the students consented that smartphone usage enhance their Mandarin performance based on language activities done via smartphone. This shows that any types of activities using smartphone will improve their learning outcomes.



**Figure 3.** Smartphone Applications in Learning Mandarin (in %)

In tasks accomplishment, as smartphones have supported the students' critical aspects in learning so they (80%) are able to accomplish learning task more quickly and 79.8% that more learning tasks can be done. The significant difference for task accomplishment is 0.22 which indicated that smartphone usage has made students accomplish task easy and more quickly based on language activities done using smartphone. In sum, any types of activities using smartphone will help them in completing their learning tasks.

Last but not least, SA usage has impact students' learning process. All the participants discovered that smartphone applications could support their critical aspects (65.9%), ease their study (83.5%), enhance their study effectiveness (69.9%) and be useful in their study (87.3%). The significant difference of task accomplishment (0.43) showed the participants consented that any activity done using smartphone has influenced their study in positive way. The study also showed that there is no significant difference between students' study based on type of activities done.

In term of willingness in learning Mandarin via smartphone, the finding showed that more than 70% of students were willing to continue using a smartphone for Mandarin language learning. This result is agreeable to the amount in Figure 3 whereby the students consented that learning Mandarin through SA can enhance their knowledge as their effectiveness and interest in Mandarin is improved. There is also more than 70% (73.5%) of respondents claimed that they were willing to learn more about how to better utilize a smartphone to learn the Mandarin language more efficiently, and 83.5% students stated that they were happy to have learned more about

how to use a smartphone for Mandarin language learning. This provides definitive evidence from the earlier findings whereby the students found it was enjoyable and meaningful by using the smartphones in learning Mandarin and they are willing to explore the applications so that they can be more engaged in learning. Participants of the study thought that smartphones were comfortable, convenient and they can use them anywhere and anytime, which is agreeable with Geddes (2004). The respondents agreed that smartphone applications helped them in completing their Mandarin tasks and enhanced their performance not only in Mandarin subjects but also other studies. Most of them found it was exciting and willing to use smartphone continuously in learning Mandarin. They wanted to know more about the usage of the applications, and they were satisfied with the smartphone applications in enhancing their Mandarin language performance. These results suggest that smartphones are a potentially promising tool for MALL.

#### 4.5. Discussions

This study explored how Mandarin students used SA to learn Mandarin language and to explicit their opinions on the newest superior mobile technology. The result shows that the respondents did not need any introduction on how to use the smartphone applications. The students are basically 'digital natives' and 'net generation' in which they are technological friendly and digitally fluent (Chua, Ahmad Tajuddin, & Goh, 2017). Based on the result of this study, the undergraduates agreed that smartphone applications were comfortable and convenient to use anytime and anywhere, and the findings relate closely to

Turkle (2011) and our recent series of studies in this area (Chua, Ahmad Tajuddin, & Goh, 2017) whereby the students found learning more interesting using smartphones. The paradigmatic development of the MALL framework for enhancing language teaching (Wong et al., 2010) has resulted plenty of smartphone applications appeared online for language learning. All the smartphone applications are complete with audios, pictures, songs and games. These advanced inventions are evident of the focus of MALL which is slowly changing from static content-based to mobile design-oriented studies. This will then lead to a positive motivation (Khong, Nurul Husna, & Norasrani, 2017; Chua, Ahmad Tajuddin, & Goh, 2018) in use of the MALL activities in enhancing their learning of Chinese as a foreign language.

Mobile-assisted in teaching and learning Mandarin should be developed and practiced by the instructors in their language classes (Chua, Ahmad Tajuddin, & Goh, 2018). This approach shows that students enjoyed exploring using SA via smartphone and they expressed willingness to use SA in future. This finding indicated that mobile devices had changed foreign language instructional methods and learning strategies with today's students (Abdous et al., 2009). Didactic learning in MALL is given a great potential in supporting teaching and learning by using the smartphone applications and this can be applied. Didactic learning is learning from the mobile educational material, including novel formats such as e-books and web caching. There were sets of pedagogical approaches can be referred by the instructors.

Even though the students' attitude towards smartphone applications is positive, it is essential for the instructor to manifest the learners a new technological affordances system (Yu, Sun, and Chang, 2010; Chua, Ahmad Tajuddin, & Goh, 2018). Regarding this, instructors need to guide the students to optimize the utilization of the smartphone applications in learning Mandarin which include variety activity design, autonomous and collaborative learning to be combined with their cognitive underpinnings of language learning to enhance their competence (Tan, Lim, & Kor, 2017). The overloading cognitive knowledge and information in the use of application might not bring in the actual use of the language in daily communication. In short, smartphone applications, as well as other mobile technologies should be further studied to benefit better for both the Mandarin teachers and students.

## 5. Conclusions

In conclusion, enhancing learning is the core in the use of any learning technology (Hasnah, 2016). Smartphone applications are thus ideal learning tools to enhance independent and ubiquitous learning in and out of the classroom and to enhance achievement (Muslaini, 2018).

The study has carefully explored the smartphone applications that respondents used. Most of the students used SA in finding new words, sentences regarding their meaning and pronunciations. They enjoyed using the smartphone applications, and they were fluent using them, and this method of learning has improved their language performance. The overall, majority of the students satisfied with using the smartphone as their Mandarin learning tools. All in all, smartphone applications and the guidance from instructors will be another way of teaching Mandarin to the students who have grown up using these advanced technologies.

Despite the contributions of this study to MALL, it is not free from limitations. One of the limitations of the study is lack of generalizability. The investigation was carried out with a limited number of participants. Although the results were revealing and of practical value to the authors and their institute, caution must be taken when the results are to be generalized to other settings. The generalization issue can be addressed by conducting more action research on MALL which focuses on how SA can be pedagogical applied in learning Mandarin and the relationship between MALL in Mandarin and performance regarding listening, speaking, reading and writing skills. For future studies, it is good to explore more on the influencing factors of mobile foreign language learning based on any model that available such as UTAUT Model (Gan, & Zhong, 2016) and etc. This is to validate the positive use of MALL in supporting and enriching the teaching of Chinese as a foreign language.

Finally, it is essential to understand the issue of smartphone applications in learning Mandarin and the students' attitude towards effectiveness and satisfaction of smartphone applications (Harwati, Melor, & Mohamed Amin, 2016a; Chua, Ahmad Tajuddin, & Goh, 2017). First, it is for the teachers to adapt MALL activities, especially how smartphone applications enable teachers to reduce workload and innovate teaching practices. This will then direct to the intention of use of MALL (Ali, & Arshad, 2016) in the Chinese classroom by both the instructors as well as the students. Besides, it can be an exciting tool for students because the teenagers in this mobile-technology era can perform ubiquitous learning efficiently. Finally, the Mandarin learners can practice their language after their Mandarin course anywhere, anytime and at their own pace and convenience.

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