Development of "Xiaohua Online" an Apps in Mandarin Language Classroom: A Pilot Study

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Abstract

Traditional methods of language learning have certain limitations. Through the development of game applications, learners' memory can be deepened, and their interest and motivation can be stimulated to improve their learning efficiency. The researcher applied a literature review, app review and questionnaire. The subjects of the research consisted of non-Chinese Mandarin learners. After review, learners wanted to have an app based on the course syllabus. Every currently available program is geared toward the practice approach. In addition, the language medium that is used in the apps is most commonly English, and the researchers have not come across any Chinese learning programs that include the Malay language as an attached component. Games applications based on stories can help to increase learners' interest in learning, and the process of progressing through levels can make learning both challenging and interesting. An application with additional Malay annotations can make the software more valuable and convenient for Mandarin learner who had mastered Malay. Thus, researchers came up with the concept of "Xiaohua Online" to address this issue. "Xiaohua Online", is an online game for beginners in Mandarin. Using the search for a scattered map of Sarawak as the main thread of the game, it integrates the learning content from the UiTM Mandarin course. Based on a systematic and well-developed game curriculum, as well as targeted tests, it is hoped that it can breaks through the constraints of time and space, thus enhance learners' sense of achievement and motivation.

Keywords: *Game application, Mandarin language, App-based Learning*

1.0 Introduction

With the rise of China, the non-Chinese community in Malaysia is placing more and more emphasis on the Chinese language. The Mandarin language course at UiTM aims to improve non-Chinese learners' ability to understand and use the Mandarin language. Chinese language classes are taught to a specific group of non-Chinese Malaysians. Regarding the composition of the teaching classes, institutions generally divide the classes according to the students' majors or the students' Chinese language level. As a result, the students in the class may come from different races and have different cultural backgrounds, living habits, religious beliefs, etc. Fun-teaching in Mandarin is the active use of fun in the teaching of Mandarin as a language so that learners are motivated to learn and enjoy the learning process. Traditional methods of fun-teaching have certain limitations. For example, they do not arouse learners' interest, have limited training time, and are not as

relevant and effective as possible. Language learning requires a lot of repetition and constant reinforcement. App-based fun teaching caters to the needs of learners.

Xiaohua Online is a concept and is currently under development by the authors. The concept of the self-develop game app Xiaohua Online is a practical Mandarin app that provides a virtual game for learners to experience learning Mandarin. Xiaohua, as a person's name, is also the main character in the game. It also means fluent in Mandarin. "Xiaohua Online" means that Xiaohua is always by your side, assisting you in learning Mandarin. The game is based on the search for a scattered map of Sarawak and incorporates the key learning elements of the Introductory Mandarin Level 1 (TMC401) syllabus. The learning topics cover scenarios that occur in everyday life, such as greetings, self-introduction, family, birthdays, day and time, daily activities, sports, etc. Therefore, this study will develop the game learning software "Xiaohua Online" from the perspective of the advantages and design principles of the game-based fun teaching method, to stimulate the learning interest of non-Chinese learners and improve teaching efficiency.

1.1 Problem statement

Yang (2016) found that over 80% of students were unwilling to answer proactively in class. The study pointed out that students emphasized the teacher's teaching level and attitude; the students were dependent on their mother tongue and the inadequacy of using more advanced teaching techniques or aids in teaching Chinese as a foreign language. With the impact of the COVID-19 global pandemic, teaching and learning in the classroom have come with new challenges.The developmentt of learning applications to stimulate Mandarin language learners' interest in learning Mandarin in a relaxed and enjoyable environment is the primary issue to be addressed in this study. Due to limited class time and the lack of Chinese environment, teachers need to revolutionize teaching methods to break through the constraint of time and space.

1.2 Research objective

The application has been developed to help learners learn Mandarin easily through games anytime, anywhere. As a basic Mandarin learning app for non-Chinese learners, Xiaohua Online is a useful addition to classroom teaching. The game is an effective way to enhance the length and intensity of Chinese language teaching and is a good companion after class. Through the online game, learners can practice the points in their textbooks in a targeted manner, deepening their memory and improving their language learning.

In addition, Xiaohua Online creates a certain context. The game is based on the player helping Xiaohua to find a scattered map of Sarawak and integrating the basic Chinese language learning content into each level of the game. Students can easily grasp the key learning points during the game, which is fun and educational. This app is hoped to relieve students' learning stress. The online games are implemented in a way that helps to relieve the students' tension in learning Mandarin while adding fun to the process. In turn, it

will get them interested in learning Mandarin and motivate them to learn. In short, the game must be designed with the learner in mind, and the learning content must be based on the real needs of the students. The aim of Xiaohua Online is, therefore, to break through the constraints of time and space, to stimulate learners' interest and motivation, and to improve learning efficiency.

1.3 Research questions

1. What Mandarin learning app is available in the market?
2. What are the design principles of game-based methods?
3. What are the advantages of the game-based method towards language learning?

2.0 Literature review

In this section, we can use existing research to understand the state of teaching and learning in Chinese language classes. Many researchers studied the relationship between fun learning, especially game-based learning with in-class participation, learners' motivation and student engagement. Furthermore, relevant research on software development is also important.

2.1 Advantage of game app

Thesis by Qiao (2011) introduced foreign Chinese language fun-teaching method from theory to practice. Firstly, from the aspect of theory introduced the fun-teaching method as well as the importance of teachers' requirements in all aspects; then showing some Chinese fun-teaching methods and techniques in term of class type, language elements and learners' level. Finally reached the conclusion that the goal of Chinese fun-teaching is to make learners enjoy learning every minute with greater passion to learn all about Chinese content, forming a benign loop.

Thamvichai et.al. (2012) implemented a points-based system to integrate game mechanics into an engineering curriculum. Through a quick questionnaire, the researchers found that students were motivated to engage in the given tasks.

Lila and Martha (2017) study examined how gamification techniques were operationalized by eight professors and one director of instructional technology. The results of interviews among a purposive sample show that gamification improves learning outcomes. Subjects ranging from computer science and technology to languages and multimedia journalism are taught in classrooms on campus, online, and in hybrid settings. Game design mechanics such as points, challenges, and collaboration rank as the top three elements of gamification. Professors noted increases in student coursework completion and discussion participation; students were exposed toreal-lifee situations and had fun learning. This study addressed the gap in educational

perspectives through gamification to encourage desirable behaviour for the benefit of the learner community.

2.2 Challenges in game app

The study objective of Joorabchi et.al. (2013) is to understand the challenges mobile app developers face in practice. The results reveal that dealing with multiple mobile platforms is one of the most challenging aspects of mobile development. Also, creating a reusable user-interface design for the app is a trade-off between consistency and adhering to each platform's standards. Mobile developers need better analysis tools to measure and monitor their apps. Also, testing is a huge challenge currently. Additionally, most developers feel that current testing tools are weak and unreliable and do not support important features for mobile testing, such as mobility (e.g., changing network connectivity), location services, sensors, or different gestures and inputs.

There are two important recommendations from Cahyani (2016) research. First, using gamified learning scenarios as an activity to encourage students to try new things and avoid the fear of making mistakes. Secondly, the gamification in education setting needs students to participate deliberately to ensure the gamification retains the game-like nature.

Other than that, for teaching foreign languages, the self-develop game app is a cross-programme collaboration. Developers sometimes find it hard to learn new programming languages. They often confront unfamiliar programming terms that require the visualization of the processes that occur in the computer memory. The objective of Khaleel (2018) paper is to discuss a comprehensive methodology for developing and validating a Gamification-Based Programming Learning Framework. The framework integrates learning theories, game elements and programming learning requirements. Both qualitative and quantitative research methods are employed. The methodology is divided into three phases: analysis, innovation, and validation. Each phase consists of steps and evaluations which must be completed before moving to the next phase. Other researchers could adapt this methodology to develop a learning-based or game-based learning framework.

Fan (2021)'s article mainly introduced the important role of game orientation in teaching, and analyzed the current problems in computer programming teaching, and proposed to stimulate students' interest in learning, choose game content reasonably, innovate course evaluation methods, and train the students to learn independently.

2.3 Past studies of game app in language

In addition, WeChat is one of the popular applications of mobile devices. Many researchers have realized that incorporating games into the learning process can be a great motivator for students. Chen and Long

(2018)'s paper puts forward the research and design of "gameplay" learning platform based on WeChat mini program and discusses its overall design and platform sub module design. Kuang (2021) used WeChat as a mobile learning platform and based on the concept of flipped classroom education, design a new teaching mode of Chinese, and subsequently carry out the teaching practice. Compared with the traditional classroom teaching model of Chinese characters and the examination results of Chinese characters after teaching, the flipped classroom model has achieved a better teaching effect, which is a useful exploration and attempt at the application of the flipped classroom concept in Chinese teaching practice.

Cheng (2018)'s master's thesis analyzed the significant advantages of game-based fun teaching methods in comparison to traditional teaching methods in teaching Chinese as a foreign language based on the practical experience of Chinese teaching in primary schools in Thailand and tried to summarize the teaching principle in the practical application of game-based fun teaching methods. In addition, the author also puts forward his own thinking and game suggestions by innovating existing game cases and applying game-type interesting teaching methods to Chinese phonetics, vocabulary, and Chinese characters.

Zhao (2019), through the survey and analysis feedback of international students studying at Zhengzhou University, took the development of mobile Chinese teaching applications in the context of the "Belt and Road" as a representative, and put forward opinions on mobile Chinese language teaching applications for mobile phones. The most competitive aspects of Chinese language education applications are self-selected learning, personalized push function, omni-media platform function, social interaction function, life service function and humanized user interface design.

From the above literature, we found that in the past App programming teaching, although teachers used games to improve students' attention, due to the deviation between the course content and games practically, it was difficult to improve the quality of teaching and learning.

3.0 Methodology

The researcher applied an app review and questionnaire. The research subjects comprised 52 non-Chinese Mandarin learners, taking Mandarin courses in UiTM. The participants were chosen based on certain criteria, which students must have taken an Introductory Mandarin Level I course and be enrolled in a degree course at UiTM.

The roles of mandarin learner preview are crucial. A structured questionnaire, including Multiple-Choice Questions and Rating Scale Questions, was used in the study to gather the perception of the future mandarin learner, the app user; questions were organized in order based on what participants answered, allowing the researcher to delve deeper into what they believe and consider what may apply to their answer.

3.1 Game app articles selection criteria

The method was developed through a review of the literature, which included articles from reputable journals and electronic databases. According to Piasecki et.al. (2017), Google Scholar cannot be used as the systematic review's sole source. It could have resulted in the "bubble effect", a type of selection bias (Curkovic, 2019). As a result, Google Scholar was used as an additional source in this paper. Certain inclusion criteria had to be met by the articles that were to be considered for the review. These criteria included:

- The article must be published in English or Mandarin.
- The study must address Mandarin language teaching and learning.
- The study must address the use of mobile technologies and applications in third-language teaching and learning.
- The article should have been published in the journal or conference proceedings between 2011 and 2022.

The following were the exclusion criteria or elements that disqualified papers from being included in the review article:

- Article without an abstract
- Article in language other than English or Mandarin
- Article that was inaccessible
- Article outside the specific time frame

The search was performed in Jun 2022, after limiting the results to the period of 2011 to 2022, and language: English or Mandarin, totaling 13 articles, remained.

The keyword "Mandarin Learning" was used to conduct a search for apps in both the Apple App Store and the Google Play Store. The search took place on 30th August of 2022. Researcher sorted the search results alphabetically and compared the lists of apps found in the Apple App Store and Google Play Store to find the 18 learning apps that are available in both stores. Then, in both stores, search with the keyword "Language Learning." Following that, eleven learning apps were discovered in both stores.

The researcher examined the 28 apps further and selected them based on three inclusion criteria to ensure the apps' close relevance to the topic at hand. First and foremost, the app should be a tool for adult Mandarin learning. Second, due to the significant differences in education between general and special education, the apps' target users should be general students with no special needs or requirements. Third, the language learning apps found must consist of Mandarin learning. After removing disqualifying apps, 22 apps were chosen for this study's review as listed below.

Figure 1: *List of Application*

No.	*Application name*	*Logo*
1.	Learn Mandarin Chinese Phrases	
2.	Simply Learn Mandarin	
3.	Learn Chinese Mandarin	
4.	Chinese Skill	
5.	Super Chinese	
6.	M Mandarin	
7.	Chineasy	
8.	Learn Chinese HSK1	
9.	HSK Study and Exam	
10.	TCB-Read and Learn Chinese	
11	PORO Learn Chinese	

12.	Pleco Chinese Dictionary	
13.	Du Chinese	
14.	HelloChinese	
15.	Duolingo	
16.	Busuu	
17.	LingoDeer	
18.	Hello Talk	
19.	Memrise Esay language	
20.	Rosetta Stone	
21.	Mondly: Learn 33 Language	
22.	MosaLingua	

The selected apps are then evaluated further for its characteristic and capabilities. The language skills and app component targeted by the applications are being investigated.

3.2 Xiaohua online app developing procedure

In this age of mobile Internet, applications are quickly becoming an integral part of daily life. The use of apps as a tool for education is becoming increasingly popular today. Programming development and production that does not require programming are the two primary categories that make up application creation. Due to the shortage of research funds and the lack of programming expertise, the researchers chose the latter as the research object.

About an app content drafting, the researchers engaged in an in-depth discussion regarding the material provided in TMC401 textbooks and syllabus. The researchers created Xiaohua centric situational situations based on what they anticipated will be covered in TMC401. The dialogue between the characters propels the plot. In dialogue mode, the player assumes the role of the protagonist as they travel through the game by answering questions and accomplishing tasks to unlock the next piece of the map and the next level. The scholars also translated the original Chinese manuscript into Malay and English for the benefit of the language learner. The developers of the study even gave the app's protagonists a Chinese appearance. The main figure is dressed in Hanfu attire. Learners are presented the draught to solicit their comments on the design and usefulness of the application.

4.0 Findings

4.1 Language used in app

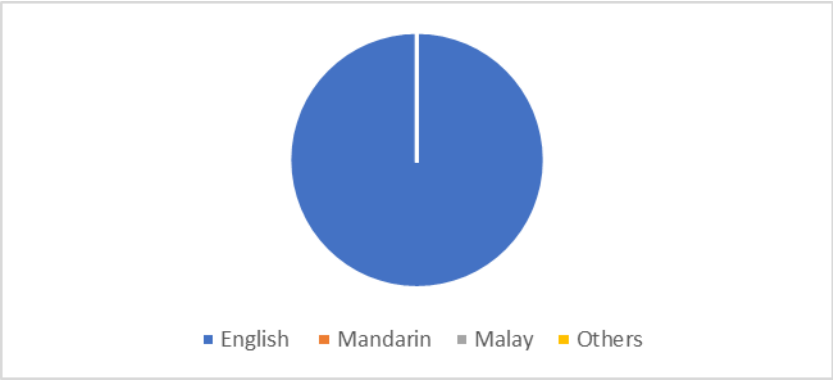

Figure 2: *Language used in App*

From the survey throughout the applications, it is revealed that 100% of the leaning app are English based. This is because English is the most common language used to help in second language learning. However, this would be a challenge for individuals who are not fluent in English but can utilize Malay fluently. Creation of an app which is bilanguage-based example English-Malay would benefit students more. Xiaohua Online will then overcome this issue as it is an app which included English and Malay and this would be more user friendly compared to others.

4.2 Language skill

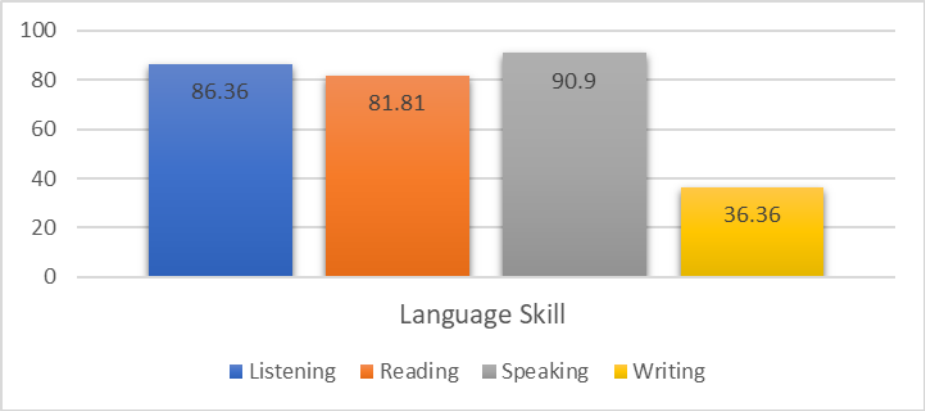

Figure 3: *Language Skill*

According to the displayed figure 3, most of the apps teach three language abilities i.e., listening, reading, and speaking, while only 36.36% develop learner's writing skills. This is because writing is the most difficult skill to master when learning Mandarin. To alleviate the difficulties of learning characters, several scholars have proposed delaying the introduction of characters in beginner classes and emphasizing the teaching of Pinyin, the Romanization of the characters' pronunciation (Poole & Sung, 2015). Approximately 90.9% of the applications offer speaking skills, which is a key ability for language learning as languages are responsible for message transmission.

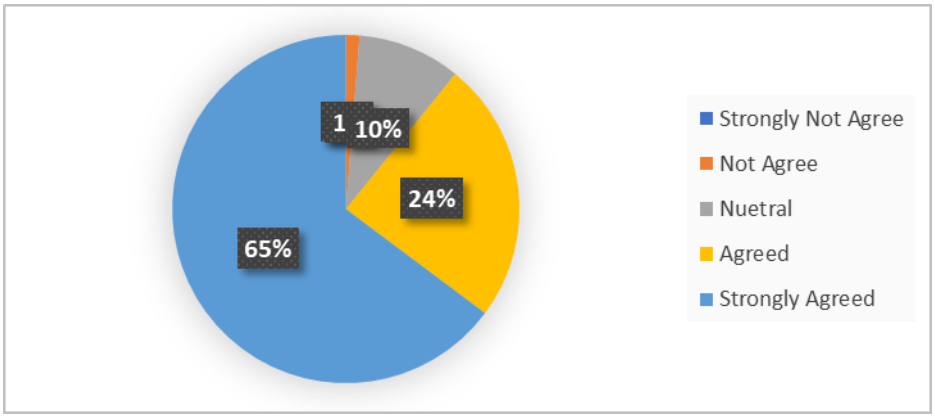

Figure 4: *Inclusion of Language Skill in Apps*

65% of respondents strongly agreed that the Mandarin Learning App should have four language skills: listening to and speaking Mandarin, reading and writing in Mandarin, and writing in Mandarin. Figure 4 drew our attention to this fact. This would make it much easier for them to master the language. When Xiaohua Online reaches its full potential, it will be capable of meeting the needs of students.

4.3 Storyline games app

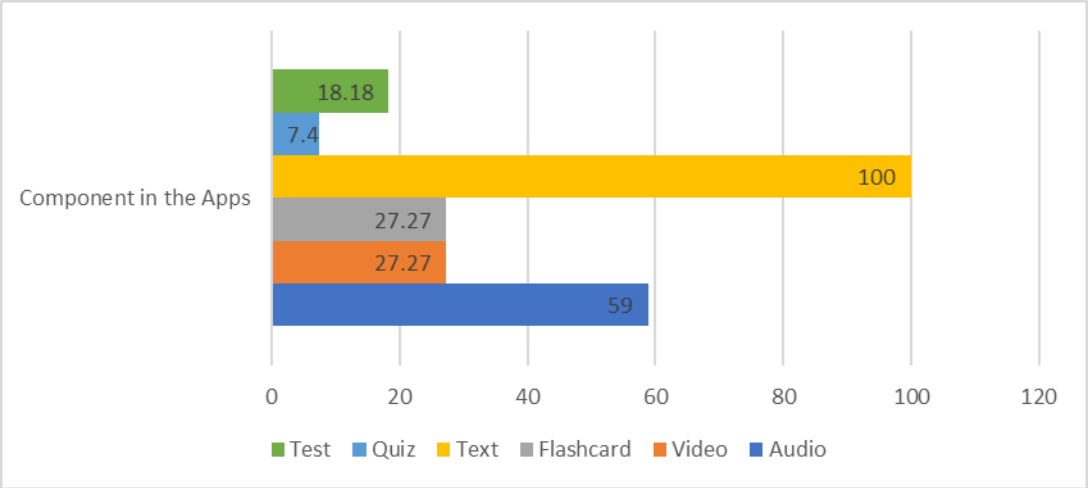

Figure 5: *App's Component*

According to research, most of the apps consist predominantly of flashcards, video, audio, and text. All the apps do consist of elementary text for learner. As text provide the reading skill's practice and it also let learners recognize the characters. About 59% of the apps included audio component in their apps. However, none of these apps are games based on storyline.

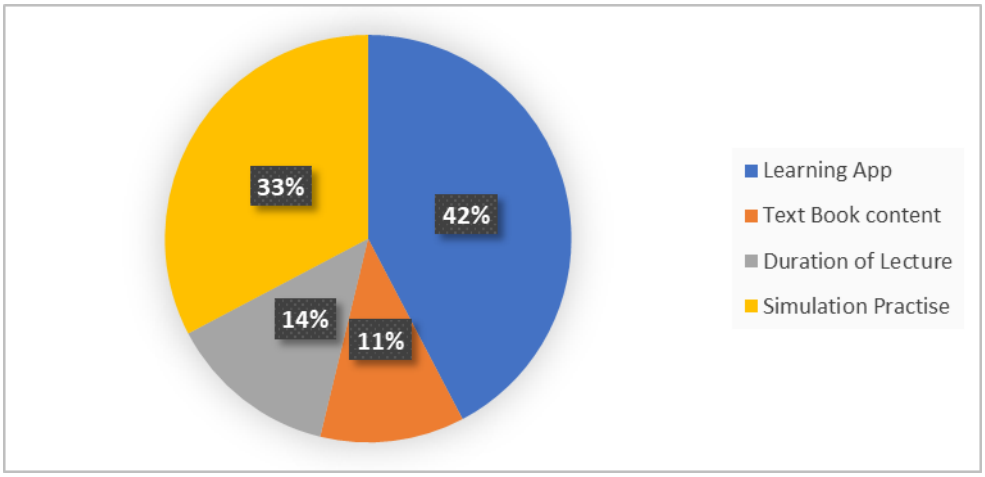

Figure 6: *Lacking of Current Mandarin Programme in UiTM*

Researchers discovered that students are not lacking information from textbooks nor are lectures too short. However, responses revealed that language learners require learning apps for self-study and more regular simulation exercise to allow them to apply their language skills. With the creation of Xiaohua Online, the problems will be readily resolved.

Although data shown that a large number of learner request for language app in their learning progress but learning app using isn't the most efficient method to learn the Mandarin language according to their belief. They even indicated that attending lecture and studying notes given is the most preferred method for Mandarin language learning. Figure 7 shown us the fact. 59% of respondents selected attending lectures and examining notes as their preferred language-learning technique. This may be because they have access to fewer language-acquisition-appropriate learning applications. Low application usage experience would be one of the factors. The fact that there are no TMC401-specific language learning apps also contributes to the problem.

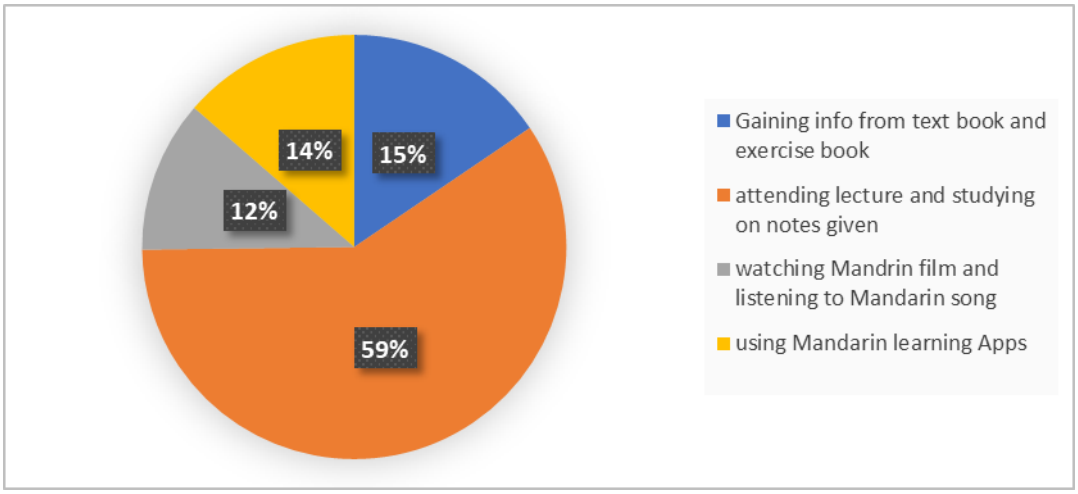

Figure 7: *Preferred Mandarin learning method*

4.4 Xiaohua online feedback

About 38.5% respondent agree that there should be an app created focus specifically on TMC401 syllabus. 46.2% even strongly agree on the point. This is clearly shown in figure 8. Possibly, with the advent of Xiaohua Online, this issue will cease to be a topic of discussion.

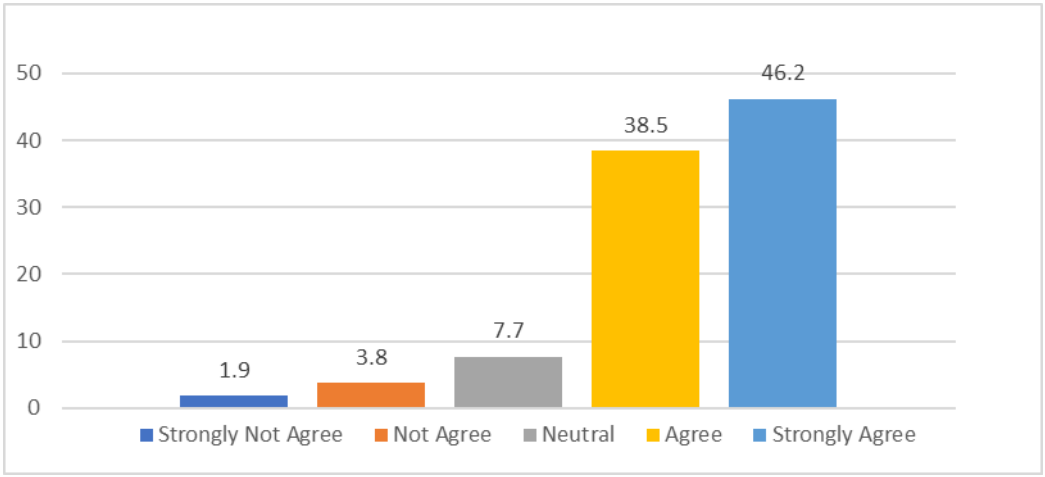

Figure 8: *Creation of An App that Focuses Specifically on TMC401 Curriculum*

5.0 Discussions

Learning a language, like developing a game, is a complex and comprehensive artistic creation. The research and development of mobile App Xiaohua Online is a good entry point for language learning Mobile phones have become a part of people's lives and learning Mandarin through mobile phones will be more easily accepted by learners. Therefore, this section will further discuss the advantages and design principles of application teaching.

5.1 Advantages of teaching with app

5.1.1 *Enhances learners' interest in learning*

In the traditional teaching method of language courses, the form of teaching is relatively simple. Teachers teach, students listen. After a class, the content that students can master and memorize is limited. After explaining the text, the teacher asks the students to repeat and memorize according to the content of the textbook. After class, they consolidate the knowledge points through the inherent exercises, and the students are prone to get bored.

Gamification is a contemporary educational approach that leverages the characteristics of gaming culture (Lila & Martha, 2017). The use of apps is one of the fun teaching methods. Its advantage lies in the fun and storytelling of the game itself, which teachers can make clever use of to attract students' attention and stimulate their interest in learning. Students themselves are interested in the learning content, and they will learn independently and complete the learning tasks better.

5.1.2 *Reduces learners' intimidation in the learning process*

Learning Chinese is especially difficult for learners from Indo-European languages countries. These unavoidable practical reasons and the preconceived subjective impressions of learners make many learners feel fearful. Simply adopting the traditional teaching method, where teachers recite and explain vocabulary and students follow along, will make learners feel that learning Chinese is boring and difficult to learn. Coupled with the complex strokes of Chinese characters, it aggravates the fear of students and consumes their interest in Chinese. Once learners become bored and resisted, they will eventually give up learning Chinese.

Playing games and learning Chinese through the App can effectively relieve learners' tension. Learners' curiosity about the game itself can stimulate their intellectual curiosity. By arranging the learning objectives and content reasonably in the game, learners can master Chinese knowledge in a relaxed and pleasant game, which will make the learners psychologically easier to accept the new language and reduce the negative emotions of learning.

5.1.3 *Improve learners' communicative competence*

The goal of language teaching is to enable learners to communicate in the target language. Learners who learn a third language are generally only exposed to Chinese in the classroom, and the language knowledge they learn is also a fixed expression in the textbook. If there is no good language environment, it will be difficult for learners to use it flexibly in communication. Due to limited class time and lack of Chinese environment, teachers can use the App to break through the constraints of time and space. Use games to build real communication situations, which are different from the fixed expression patterns and situation settings in textbooks. Under the guidance of games and stories, learners comprehensively use the knowledge they have learned before, and conduct autonomous learning according to the language situations provided. Game software with rich story scenarios can provide learners with more realistic life scenarios. Through repeated practice, learners can flexibly apply Chinese in real life.

5.1.4 *Sharing of educational resources*

The lack of comprehensive access to high-quality educational resources remains a global problem. The sharing of educational resources not only meets the actual needs of schools in the teaching process, but also helps to solve the problem of uneven educational development in different regions. It is worth noting that App game learning gives teachers and students a lot of flexibility in the specific implementation. The development of small programs in applications, especially light games, can not only meet the needs of the market, but also strengthen the promotion of gamified learning thinking. While the resources of higher education institutions are out of reach for outsiders, Mini Programs can help colleges and universities spread the existing teaching resources such as high-quality courses, courseware, and question banks, so that more people can benefit.

5.2 Principle application design of Xiaohua Online

Xiaohua Online focuses on the learning content of Introductory Mandarin Level 1 and designs a learning mode of “Challenge Games". The mode is divided into 6 levels, representing the 6 stages on the syllabus. The design principles of the game follow the two principles of purpose and entertainment.

5.2.1 *The purpose*

To develop game learning software, the first thing to be clear is whether the content of the game used is consistent with the teaching objectives. The developer also needs to judge whether the selected game content and difficulty are suitable for the learner's Chinese proficiency. Learners can’t play games for the sake of games, completely ignoring the teaching purpose and teaching content. Through games, learners must really

acquire knowledge and improve their Mandarin language proficiency and ability. The content design of game software must clarify the key and difficult points of learning. The game content must be designed according to the knowledge points of each lesson and reflect the teaching content reasonably and effectively. For example: in the first level of the game, the first meeting between the player and the game's protagonist Xiaohua brings out the theme of the first lesson of the teaching content "self-introduction". Throughout the design and implementation of the game, developers ensure that the game serves for teaching and knowledge.

Xiaohua Online is a game software for courses, and its aim is to enable learners can effectively master the language through games. The content of the game is to reorganize and design the course resources. The basis of learning is by importing Chinese knowledge points before the start of each level of the game. When each level of the game is in progress, the level-breaking problem is imported, and the relevant attribute settings for the learning task, such as completion time and score calculation are carried out. After the game is over, the teacher can ask the learners to summarize the whole game process and evaluate the learners' game completion and success rate, observe the learners' learning effect, and summarize the effectiveness of the game. This effectiveness is often reflected in the lectures, recitations, and comprehensive presentation of the learned content after class.

5.2.1 *The entertainment*

Game software is developed to make the learning process of students more interesting. Since it is a game, its form should be livelier. Xiaohua Online follows the learning mode of "passing through the game" to make the learning process of students full of fun. The game is mainly divided into two stages, namely the independent learning stage and the test stage.

i) Independent learning stage

Design an autonomous learning system. The system will automatically recognize the students who logs in for the first time as a student role, and let the students choose their own gender and image photo. Then, students can click on the "Knowledge Points" section to learn new vocabulary to help them pass the next level. After completing the study, the students will enter the level-breaking game.

ii) Pass test stage

Design a test system for passing the level, and the designed level-breaking questions will be advanced layer by layer according to the main line of the story. The test questions are multiple-choice questions, which test learners' mastery and comprehension of the language. All test questions will be imported into the platform in three dimensions: difficult, medium, and easy to form a course test task.

There are many multiple-choice questions in the quiz task. If the learners answer correctly, learners will continue to pass the level, and if the learners answer incorrectly, learners will go back to the starting point of each level. When passing the level, if the learners can complete the test within the limited time and answer all the questions correctly, then the level is successful, and learners will get part of the puzzle. After completing all the levels, learners can spell out a complete map, submit it to the learning ranking list, and graduate successfully. The game effect allows students to get the pleasure of the game and enhance the entertainment.

6.0 Conclusion

Mobile learning is in line with the fast-paced nature of contemporary life and international communication. There is a huge market potential for applications designed to meet the needs of today's mobile learners. As educators, we need to be proactive in understanding and mastering these technologies. We should actively engage with them and create greater change, so that Chinese language teaching and learning is aided by information technology and given a wider scope for development.

The game method is designed to increase learners' interest in learning. It allows learners to experience a sense of achievement in learning Mandarin and eliminates intimidation. Learners can play and learn at the same time, easily grasping the knowledge and deepening their memory, thus improving their communicative competence in the language. Therefore, by introducing the game method into the application with the learner at the centre and by arranging it in a rational way, we can maximise the teaching and learning objectives.

At present, "Xiaohua Online" is only in the concept stage and is being developed by researchers. We believe that if the development is successful, the educators can make good use of the “Knowledge Points" part of “Xiaohua Online” in the pre-class stage to let learners learn independently and realize the transfer of new knowledge. The mid-class stage is based on traditional teaching methods and takes place in the classroom. Educators transfer learners’ knowledge by teaching and answering questions, communicating, and interacting, and collaborative learning. The after-school stage is to complete the consolidation and expansion of knowledge through the game in “Xiaohua Online”. Educators and learners, or learners, can communicate, comment, and give feedback to consolidate learning achievements and increase the sense of achievement in learning.

Constructing the software for this game is currently the most important thing that must be done in terms of remaining chores. This platform will then enable researchers to analyse the appropriateness, effectiveness, and scientific quality of apps for learning and teaching Mandarin language. Future research will then be aiming to find the most effective methods for teaching and learning Mandarin which is challenging in nature. This will pave the path for future advancements in this field of research.

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