Design of the ″XingSong″ Song-Based Learning Application Prototype and Its Implementation in Chinese Language Learning Activity

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Abstract

Researchers sparked the idea of designing a song-based learning application concept to get responses in the form of input from research samples to develop better learning applications in the future. Learning media in the form of songs have been used in classroom learning. Digital transformation in education into music technology as an innovative learning media. The research was conducted using a qualitative-descriptive method that begins with depth interviews, distributing questionnaires, and then using the data obtained from the user experience. Based on the results of the initial user survey, it is known that there are four classifications of learning difficulties in Mandarin, including problems in remembering Han characters, grammatical errors, difficulties in pronouncing Han characters, and challenges in hearing recorded Mandarin conversations. Based on the needs survey, the initial design of the song-based application prototype, XingSong, features a song list and music player, vocabulary list, practice, and quiz (including Pinyin Writing, fill in the blanks, and reading), speech recognition, and downloadable PDF writing practice. The XingSong application received a positive response from respondents as an innovation in Chinese learning applications. Based on testing the XingSong application prototype, researchers received input on application development regarding design aesthetics and content that can adapt to each user's Chinese language skills.

Keywords
Chinese language, XingSong, Song-based, Learning media, Mobile application

1. Introduction
Many schools and universities in Indonesia provide learning Mandarin for students. Studying languages is a good investment for yourself because the more proficient in a foreign language we master, the more positive opportunities and opportunities we will get in daily life, business, and education (Hermawan, B. and Leonardo, O.P. 2017). This phenomenon shows that Mandarin has economic value, and if mastered, it will increase Indonesia's competitiveness in the global market. This makes Mandarin one of the most popular foreign languages.

However, we all realize that Indonesian students who want to learn Mandarin certainly feel it is not easy to learn. This is because Mandarin uses pictograph letters, which are called Han characters. During the cultural revolution, the PRC government Romanized the Han characters to eradicate illiteracy. Romanization is used to make it easier to read Han characters as pictograph characters, but in language practice, Pinyin cannot replace the position of Han characters. So, in the aspect of reading and writing, it will not be separated from Han's character.

Over time, the development of Mandarin in Indonesia has begun to enter literary and artistic works due to a large number of ethnic Chinese in Indonesia, and not a few Indonesians, from children to adults, like Mandarin films,

dramas, translated novels, and Chinese songs. Listening to Chinese songs is one way to enjoy and can be used as a method in the Chinese learning process (Agy and Anggraeni 2019). Many songs can be accessed by streaming, with a wide selection of song genres. However, to support systematic Chinese learning, the Chinese songs used need to be selected based on vocabulary level and word difficulty. In addition, the selected Mandarin songs can not only be played, but also need to be designed as a systematic learning medium with synergistic uses and learning outcomes. In fact, in learning Mandarin in formal and informal institutions, the learning method using Chinese songs is used only as an ice breaking. Whereas learners' enthusiasm is generally high because the learning media used are limited to text-based ones, such as textbooks, learning modules, PowerPoint slides, and others, songs can be a new learning medium that needs to be studied.

Therefore, to solve the difficulties faced by Chinese language learners and to innovate learning media that is entertaining, the researchers came up with the idea of planning a prototype design for a Chinese song-based application called 兴松 (XìngSōng). With the hope that users can be enthusiastic (兴 / xìng, from the word 兴奋/ xīngfèn) and relaxed (松 song from the word 轻松 / qīngsōng) in learning Chinese. The idea for this application concept was also supported by an initial survey conducted by the researchers on 11 Mandarin learners from the Chinese literature department at a leading university in Jakarta. Based on the initial survey results, the researchers have classified some difficulties elementary-level learners face in learning Mandarin. Prototyping the XingSong application still requires suggestions for input from prospective users on the concept of this application for the smooth process of making the application. So, through this research, the researchers want to analyze potential users' responses to the idea of this learning application concept as the initial stage of making a song-based prototype of the Xingsong application.

1.1 Objectives
This study aims to obtain an initial design of the XingSong application prototype, which was made based on the classification of fundamental Chinese language learning difficulties. The initial design includes the user interface and the main features that will support Chinese language learning using songs as a learning medium. Respondents of this study will be asked to provide input for the proposed improvement of the XingSong application in further research.

Several things need to be done to achieve the objectives of this research, including:
1. Classification of difficulties for basic level Chinese learners.
2. Determine the initial design and main features of the XingSong application prototype.
3. Conducting trials on potential users of the XingSong application prototype.
4. Manage the XingSong application prototype based on the results of the trials that have been carried out.

2. Literature Review
Eady and Wilson (2004) stated that many studies have proven that songs as a learning medium can contribute to academic achievement, motivation, and creativity. The studies also have theoretical, empirical, and practical perspectives (Engh 2013). McMullen and Saffran (2004) conducted neural research in language and music, where learning and memory mechanisms are involved in acquiring knowledge in these two domains. In an empirical study, one researcher, Wray and Perkins (2000), found a relationship between repetition and lexical mastery. The song's combination of intonation and rhythm makes it easier for students to remember and apply the words they have learned.

Practical pedagogical research dominates this research area. Aspects discussed include motivation, attitude, learner response, and testing the effectiveness of learning using song-based learning methods. Songs become a fun new learning medium. Israel (2013) An application that combines music and songs with English lyrics, students show a positive attitude and motivation, so using music and songs makes it an innovative learning medium. Sholikhah (2017) proved that learning Mandarin through song media can give students a relaxing, fun, motivated, and not easily bored effect. Tiwan (2021) describes the use of songs as a medium of learning. Using songs as a medium has been proven to increase learners' motivation and improve their memory, concentration, and also imagination of learners in learning languages. Kurniati, Zaim, and Jufrizal (2021) found students' positive perceptions of audio media learning in learning English. Students become more motivated because the learning material becomes exciting and easier to understand. Mahyudin, E. (2018) concluded that teaching Arabic vocabulary through song media works better than using conventional learning models. Teaching language through song media makes students motivated, happy, calm, and not bored in learning Arabic. He also concluded that song media could improve students' vocabulary mastery in learning Arabic. Cahyani (2019), the media song is the right tool that can be used to inspire students' ideas and interest

in writing a simple essay because, in a song, various kinds of diction can provide words that help make a simple essay, for students and also the rhythmic stimulation of the song that is played can improve language skills, creativity, concentration, and memory of someone who is listening. Budianto (2020) found that song media can help enrich the vocabulary of elementary school students in learning English; learning English vocabulary for elementary school children using song media is fun and can improve vocabulary mastery. -words on the ability to hear and pronounce words correctly. Learning methods using songs as learning media and song-based language learning have been proven to help language learning. Digital transformation in education, turning songs into innovative learning content. Kurniawanti, Saputro, and Bahuguna (2020) found that songs effectively affect learning achievement. Sundberg and Cardoso (2018) developed a mobile application for learning French as a second language by adopting the theory of second language acquisition and proving that technology that uses songs and music as content can help language learning. Turnbull et al. (2017) utilize music technology to develop karaoke and radio applications, which are used for foreign language learning. Manco et al. (2022) use music technology to spark a new approach to the learning model, Music Contrastive Audio-Language Learning (MusCALL). This approach combines music and descriptive sentences. Through a literature review, music in language learning has received theoretical and empirical evidence. Practical research has proven to increase motivation and learning achievement, extending the perspective of music technology.

3. Methods

This research will use a qualitative descriptive approach. Respondents were selected using a proportionate stratified random sampling technique, with the population coming from the Department of Chinese Literature at a university in Jakarta, and 66 respondents participated in this study. The research instruments used were questionnaires and interviews. In-depth interviews were conducted in the initial survey of 10 respondents to classify difficulties in learning fundamental Chinese. The prototype of the XingSong application will be made based on an initial needs analysis in the form of a classification of fundamental Chinese language learning difficulties. The prototype design of the XingSong application will be tested on 66 respondents; then, the researcher will distribute questionnaires to 66 respondents as suggestions for developing the XingSong application prototype.

4. SDLC Prototype Development

The qualitative approach will focus on designing and customizing the XingSong application prototype. The prototype of the XingSong application will be refined again by using the input obtained through the respondents' survey results and adjusting features that can answer respondents' problems in learning Mandarin. The application prototype development will use the Software Development Life Cycle (SDLC) method. The SDLC method is a software application design method that has stages and is also often referred to as the waterfall model; the SDLC stages include:

1. Analysis Phase: Often referred to as Software Requirements Specification (SRS), it is a complete and comprehensive description of the software to be developed.
2. Design Phase: The process of planning and solving problems through the design of the application prototype.
3. Implementation Phase: This refers to the specification of the design into an executable program, database, website, or software component through programming and deployment.
4. Testing Phase: This is known as verification and validation, checking that the software solution meets the original requirements and specifications and achieves its intended purpose.
5. Maintenance Phase: This is the process of modifying the application prototype after delivery and deployment to improve output, correct errors, and improve performance and quality
6. The research will be conducted using a survey method distributed to respondents who are learning Chinese as research subjects and will use the XingSong application prototype as a song-based learning medium.

5. Results and Discussion

5.1 Survey of User Initial Needs

The researchers conducted an initial survey by conducting in-depth interviews with 11 respondents representing three batches of students in the Chinese literature department. This initial survey aims to classify errors that basic Chinese language learners commonly encounter. The classification will also be a reference for designing a questionnaire distributed to 66 respondents to map the initial needs of prospective users from the XingSong application prototype. Through depth-interviews, respondents told the chronology of learning Chinese from the beginning so that four common difficulties in learning fundamental Chinese can be classified, including difficulty remembering Han

characters, grammatical errors, pronouncing Han characters, and difficulty hearing recorded Chinese language conversations. (Table 1)

Table 1. Fundamental Chinese learning difficulties classification

Difficulties Classification	Difficulties Mapping	Percentage of Respondents
Difficulty in remembering Han characters	Difficult to recognize Han characters	95,45%
	Difficult to memorize Han characters	90,90%
	Difficult to write Han characters	89,39%
Grammatical errors	Difficult to read complex sentences	92,42%
	Difficult to compose essay in Chinese	87,87%
	Difficult to collocate words in Chinese	86,36%
Difficulty in pronouncing Han characters	Difficult to pronounce special consonant (such as z, c,s, zh, ch, sh)	95,45%
	Difficult to pronounce syllable with correct tone	89,39%
Difficulty hearing recorded Chinese language conversations	Difficult to recognize words in conversation	77,27%
	Difficult to understanding the meaning of the conversation	90,90%

The four classifications of common difficulties in learning Mandarin that has been mentioned will be problem-based in this study. Furthermore, the initial needs questionnaire was created based on this problem based. Based on the results of the questionnaire, all respondents already have basic knowledge of learning Mandarin. From the questionnaire results, it is known that 98.48% of respondents have experienced difficulties in learning Mandarin, and the four classifications of errors dominate the respondents' answers. So far, the way respondents overcome their challenges is by practicing writing and repeatedly reading, using applications in the form of a dictionary or translator application, or asking friends, and one of them is relying on audio-visual media such as watching films that use Chinese and listening to recognized Chinese songs. 94.1% of respondents use a tool that helps someone learn Mandarin. In addition, 64.7% of respondents have listened to or sang Chinese songs as a medium for learning Chinese. Respondents use Chinese songs as a learning resource because listening to them can improve their listening skills, and even learning to use Chinese media can also improve their reading and conversation skills. In addition, respondents also think that the song-based learning application is a new learning method that is very interesting and worth trying, efficient, and not boring.

From the survey results above, it can be concluded that the desire from the user side for the need for Chinese online learning applications is considered a high enough song. Some of the main features presented by the XingSong application that was developed include the following:

1. Song list and music player.
2. Vocabulary lists.
3. Practice and Quiz, including Pinyin Writing, fill in the blanks and reading.
4. Speech recognition.
5. Downloadable PDF writing practice.

5.2 XingSong Apps Prototype Design

In this view, the user will find the earliest display screen, and to continue to the next page, the user can press the "get started" button. Users must log in on the signing-in page if they already have a Xingsong Apps account. To log in, users can log in through their Facebook, Twitter, and google mail accounts. What if the user does not have an account, the user can sign up first. (Figure 1)
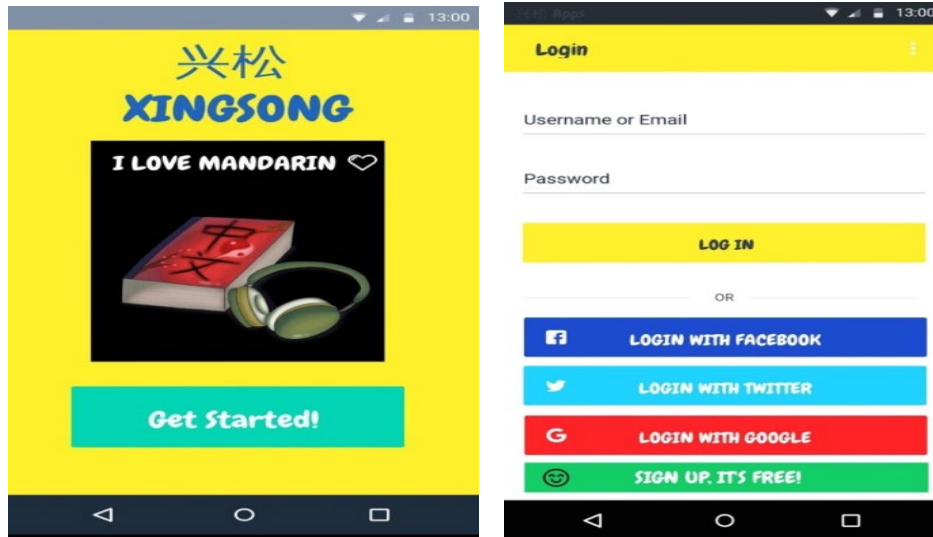
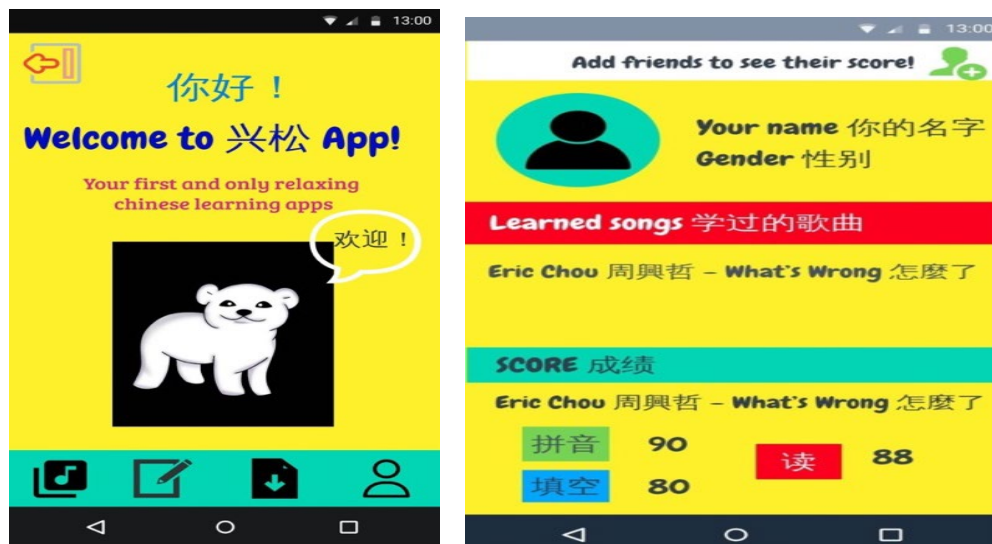Figure 1. XingSong application starting page and sign-in page display

Figure 2. XingSong application home page dan user profile display

On the home page display is a polar bear, the symbol of the XingSong application. Users can access four features on this page, including listening to songs, practicing and quizzes, downloading PDF features, and user account profiles that can add friends and see practice scores or quizzes. By pressing the people icon, users can add personal photos, view user scores, add friends, and even view friend scores. (Figure 2)

Figure 3. XingSong application song playlist and music player page display

The picture Figure 3 above displays a song list where users can choose their favorite song and start listening to it. This display results from pressing the song icon on the home page (figure 2). Users can find the song lyric page and song translations on the music player page.
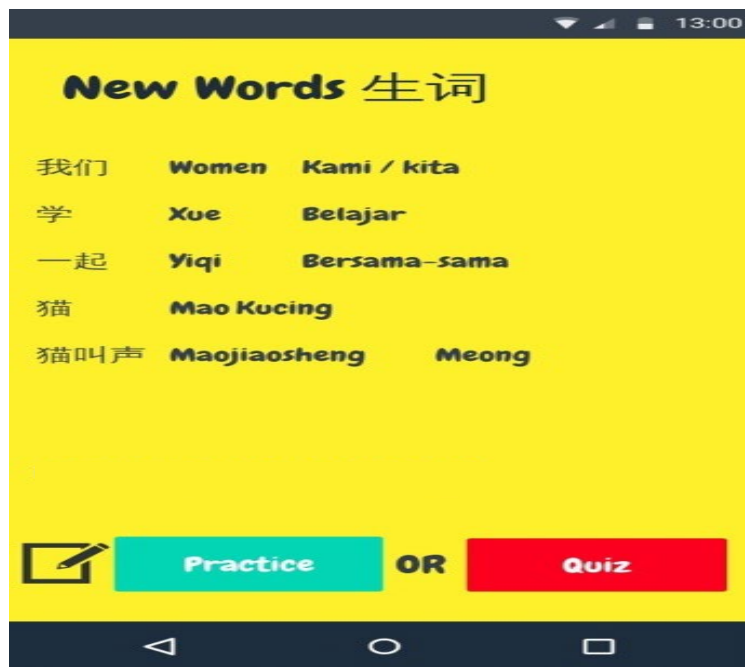

Figure 4. XingSong application vocabulary list page display

After listening to the song, the user can review the vocabulary by pressing the book icon on the right side of the music player page (Figure 4). The vocabulary list feature retrieves essential vocabulary that the user can learn. This feature contains Han, Pinyin characters and translations in Indonesian. After learning the selected song's vocabulary, users can access the practice or quiz features by pressing one of the two buttons at the bottom of the vocabulary list page.

Figure 5. XingSong application practice and quiz page display

In the practice and quiz display (Figure 5 & 6), the user can choose three exercises and quizzes: pinyin writing, fill in the blanks and reading. The three types of activities and quizzes are the types that are often used in song-based learning methods.
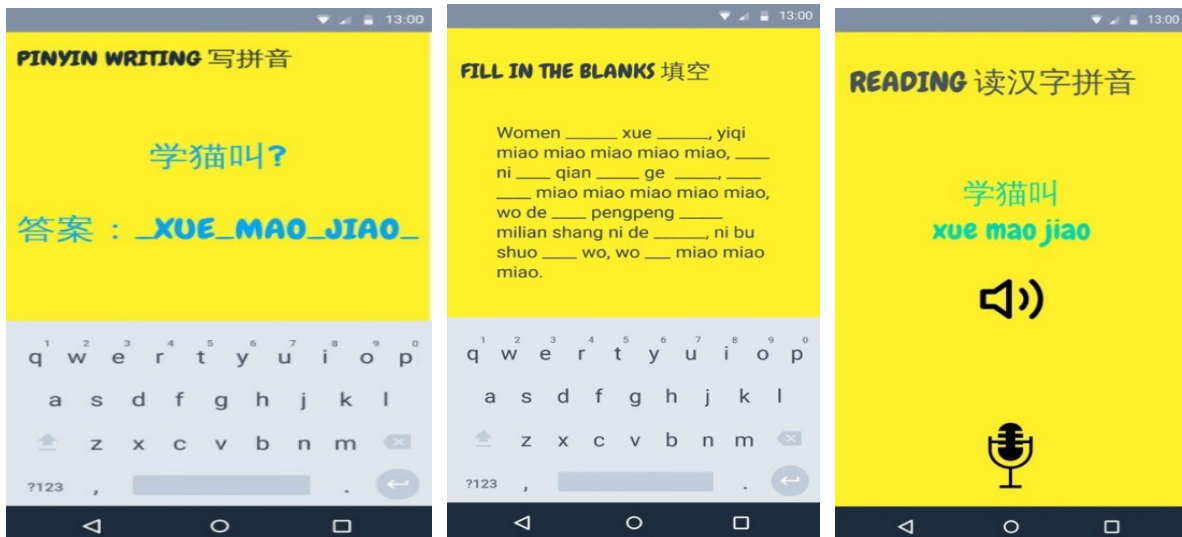

Figure 6. XingSong application practice and quiz page display

In the practice and quiz features, there is no difference because they both test the same type of questions by providing three types of questions, namely pinyin writing, fill in the blanks, and reading/speaking, which is available with speech recognition technology, where this technology can record the user's voice in the determination of quiz scores, for the speech recognition feature using google speech to text.
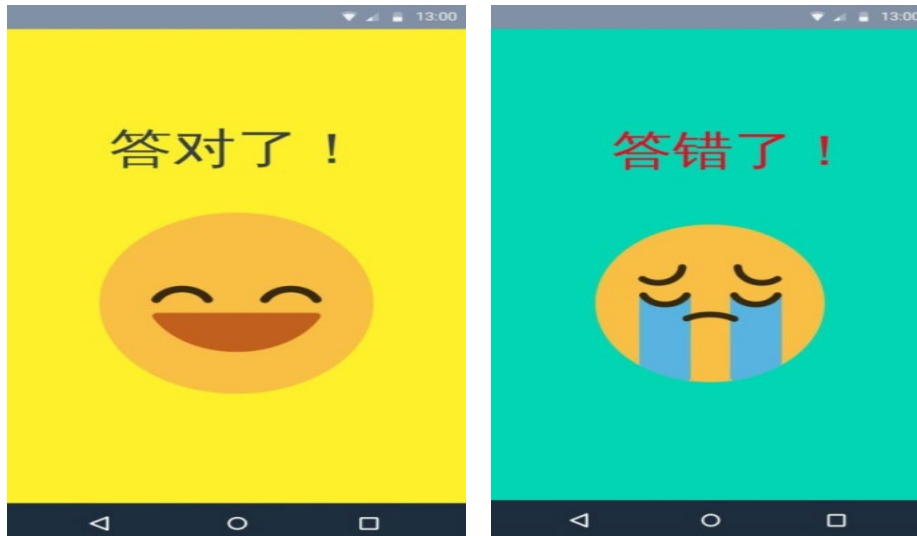
Figure 7. XingSong application correct and wrong feedback display

The picture Figure 7 above is the display that will appear when the user is right or wrong in answering the questions provided in the application. The screen display uses a laughing and a crying icon, so the user knows whether the answers to practice questions and quizzes are right or wrong.

Figure 8. XingSong application downloadable pdf writing practice display

The downloadable pdf writing practice feature allows the user to download a PDF file containing checkered paper to write strokes of the vocabulary in the song chosen by the user. The user can also review the pieces that have been studied because it is in the PDF as well. There are full song lyrics and also the translation. (Figure 8)

Respondents' opinions on the design and content of the application varied. Most said the content of this application was exciting, practical, and easy to understand, and 100% of respondents were also satisfied with the content in the XingSong application prototype. They think the content is exciting and makes them interested in using it. There are 78.4% of respondents are satisfied with the application design. Suggestions from most of the respondents after seeing the prototype of the XingSong application, it can be concluded that it is to update songs and create a playlist of songs that not only consist of adult songs but also include children's songs and also justify wrong answers in the practice

and quiz features. In addition, the design must be made more straightforward and elegant, this application must provide a ranking feature on the score, and the selection of colors on the application display must be softer and not too flashy.

Respondents felt that the advantages of this application, apart from making the independent learning atmosphere more fun and focused, was because the song selection was a popular song. Vocabulary lists make it easy for them to learn essential vocabulary in the selected song. Practice and quiz features become an assessment of their understanding. They argue that speech recognition and downloadable PDF files, as well as other features in the form of listening, practice, quizzes, and new vocabulary that can be learned, are quite complete and exciting and are innovations from a learning application prototype.

5.3 Proposed Improvements

This XingSong application prototype still has some shortcomings. Respondents thought that the display design could be improved. Their suggestion regarding the design of this application is the monotonous background of the song lyric video. It would be nice to replace it with a video or graphical background and color choices that attract the users' attention. Looking at the content aspect, respondents think it would be better to develop features with recommended song choices to be able to train users by adjusting the level first so that users can experience significant improvements in learning Chinese through the XingSong application.

Based on the test results and user input for the XingSong application prototype, future application development will focus on the screen display's color selection and aesthetic aspects. In addition, the Chinese language proficiency test will provide recommendations for personalized song choices for each user by adjusting it to the individual's Chinese language ability. Testing the effectiveness of the XingSong application can be done quantitatively to get a measurement of the performance of this application to support learning Chinese.

6. Conclusion

The initial survey showed that the general difficulties in learning basic Chinese could be classified into four: difficulty remembering Han characters, grammatical errors, problems pronouncing Han characters, and difficulty hearing recorded Mandarin conversations. Based on these problems, the researchers made a prototype design for the XingSong application, hoping to overcome these problems with a song-based language learning approach. The features presented in this application prototype include a song list and music player, vocabulary list, practice, and quiz (including Pinyin Writing, fill in the blanks, and reading), speech recognition, and downloadable PDF writing practice. Based on the survey results of testing the XingSong application prototype, it can be concluded that this application prototype is an innovation for Chinese learning applications, especially in song-based Chinese learning. The XingSong application prototype received a positive response from respondents. Despite receiving a positive response, this application prototype still has many shortcomings in design aesthetics and content leveling. In the XingSong application prototype, there is no fix for every user's answer error, and there is still no feature for the user's Mandarin level division to select songs. While in the design section, this XingSong application still needs many improvements in choosing the background color, the layout of the features in the application, and the design of each song lyrics video displayed. Some of these inputs will be carried out in the application development stage. They will be supported by experimental-based trials to test the effectiveness of the XingSong application in learning Chinese.

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