Belajar SenangJer: A Mobile Application for Illiterate Indigenous Adults

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Abstract: During the Fourth Industrial Revolution (IR 4.0) era, personal electronic devices such as smartphones, laptops, and computers have become common in an individual's daily activities. These devices have been used to communicate with others through various social media platforms such as Facebook, Youtube, Wechat, Whatsapp, and others. When the globe is facing the pandemic Covid-19, the importance of the devices had become more significant, along with the increased usage of digital wallets to enable contactless payments. Without literacy skills, an individual is far more likely to live in poverty and may be isolated in a world increasingly dependent on electronic devices. Although the Government of Malaysia has been putting a lot of effort to ensure that indigenous people's education system is at a reasonable level, there are no significant and robust changes. The illiterate indigenous adults might still be left behind due to their inability to read. Thus, the main objective of this study is to develop a specialized user-friendly mobile educational application prototype to reduce the illiteracy rate among indigenous adults in Malaysia Personal Extreme Programming (PXP), which is the derivative of the Extreme Programming (XP) of the agile method was adopted to develop the mobile. The application is being developed with the intention to reduce the illiteracy rate among indigenous adults in Malaysia. The overall findings indicate that respondents are satisfied with *Belajar SenangJer* as it facilitates the learning of Malay language through flashcards and videos. In the future, the user interface of Belajar SenangJer could be improved by providing a voice guidance function and matching games. The application could be expanded to learn more languages, such as English and Mandarin.

1. Introduction

Literacy is defined as the ability to identify, understand, interpret, create, communicate, and compute using printed and written (and visual) materials associated with varying contexts [1]. Even though the world is in the era of IR 4.0, the problem of illiteracy still exists. For example, the illiteracy rates of three African countries, such as Burkina Faso, Niger, and South Sudan are above 70% [2]. In Malaysia, specifically, the illiteracy rate among indigenous people is still high [3]. Without literacy skills, an individual is far more likely to live in poverty and may be isolated in a world that increasingly dependent on computers. Hence, the development of an educational mobile application is necessary for facilitating indigenous adults to read and write.

A mobile application can reduce the rate of illiteracy among indigenous adults through personalized learning that allows users to study at their own pace [4]. The mobile application is considered feasible as almost everyone in Malaysia has a smartphone [5]. Currently, mobile self-learning applications on the market are mostly developed for youngsters, in which the interface design is not suitable for adults. Another limitation is related to the language used and the design of the application. Therefore, the main objective of this study is to develop a specialized user-friendly mobile educational application prototype to reduce the illiteracy rate among indigenous adults in Malaysia. The application, named as *Belajar SenangJer*, introduces the structure and pronunciation of numbers, alphabets, and simple words to illiterate indigenous adults.

2. Related Studies

In the last two centuries, global literacy has grown substantially, particularly in this era of technology whereby reading and writing skills are essential to gain a better lifestyle. Literacy involves a continuum of learning in enabling individuals to achieve their goals, develop their knowledge and potential, and participate fully in their community and wider society [1]. However, it was reported that until 2016, there is 14.0% of the world's population remained illiterate. Hence, an effort of reducing the illiteracy rate is still required. In Malaysia, there are almost 6.88% of adults' illiteracy rates [2]. On the other hand, there are about 13.8% of 31.7 million Malaysian are indigenous people. Indigenous people do not belong to a homogenous population group [6]. They consist of several different ethnolinguistic groups living in Peninsular Malaysia and Sabah, Sarawak in East Malaysia. Although there are various initiatives or action plans for the indigenous education system, they did not give major and strong changes [7]. Without literacy skills, an individual is far more likely to live in poverty and may be isolated in a world increasingly dependent on computers.

The numbers of smartphone users continuously increase in a large number. For instance, in Malaysia, the number increases from 19.72 million in 2015 to 30.41 million in 2020 and it is expected to reach 33.46 million by 2025 [5]. While society was moving fast and evolving quickly, illiterate indigenous adults might be left behind due to their inability to read. The Director-General of the Department of Orang Asli Affairs reported that 99% of indigenous people (Orang Asli) subsist on a level that is below the government's classification of poor income due to lack of infrastructure, access roads, clean water supply, electricity as well as education, health, and medical care. For almost 60 years of mainstream education for the indigenous people in Malaysia, education issues have not been resolved. The government is more focused on illiterate indigenous children rather than adults. Nonetheless, the number of illiterate indigenous adults might increase if they continue being discriminated against and marginalized by the mainstream education system [7].

3. Methodology

An agile methodology, Extreme Programming (XP), specifically, Personal Extreme Programming (PXP), was utilized to develop the mobile application. The methodology is deemed as suitable for speedy software development, especially when the project needs to be completed within eight months by an autonomous developer [8, 9]. The XP software development life cycle comprised five stages; Planning, Designing, Coding, Testing, and Listening [10]. In the planning stage, user requirements were gathered once the goals for the entire project and certain iterative cycles were set up. Once analyzed, the requirements were then separated into various related tasks. The requirement specifications and the diagrams were constructed in the second stage to ensure that the application is designed and developed accordingly. The coding was initiated in the third stage, followed by testing once the prototype was completed. Feedback obtained from the testing stage was used to improve and finalized the development of the prototype. Table 1 lists the functional requirements of the mobile application.

Table 1: List of Functional Requirements

ID	Requirements Description	Variable Value
1	LESSON	
1.1	The application will display the structure and pronunciation of capital letters, small letters, basic mathematics symbols, numeric numbers, daily use words, and sentences through video.	Mandatory
1.2	The application should allow the user to pause the video of the capital letters, small letters, basic mathematics symbols, numeric numbers, daily use words, and sentences at any time.	Desirable
1.3	The application may allow a user to stop the video of the capital letters, small letters, basic mathematics symbols, numeric numbers, daily use words, and sentences at any time.	Desirable
1.4	The application may allow a user to replay the video of the capital letters, small letters, basic mathematics symbols, numeric numbers, daily use words, and sentences.	Desirable
2	ASSESSMENT	
2.1	The application will display a page to display the choice of assessment.	Mandatory
2.2	The user can take the assessment at any time.	Mandatory
2.3	The user may choose to stop the assessment at any time.	Desirable
2.4	The user can retake the assessment at any time after the first attempt has been completed.	Optional
3	PERSONAL SCORE	
3.1	The application will display a page to display a personal score of the assessment.	Mandatory
3.2	The application will allow a user to check the personal assessment score details.	Mandatory
3.3	The application will allow a user to navigate to the main page from the Score Page.	Mandatory

The requirements presented in Table 1 were translated into the computer system functionality using the Unified Modelling Language (UML) to visualize and model the requirements. Eventually, the prototype of the *Belajar Senangjer* was developed based on the gathered requirements. Software prototyping is a standard way of demonstrating the software requirements so that further comments and suggestions could be obtained from users based on their experience in interacting with the prototype. Visual Studio Code was used as the main integrated development environment (IDE) tool. Screenshots in Figures 4 and 5 show the selected interfaces of the *Belajar SenangJer*.

4. Evaluation of *Belajar Senangjer*

Since the usability evaluation was conducted during the period of Movement Control Order (MC0) between the years 2020 to 2021 and the researcher stayed in the red area, the identification of appropriate respondents was difficult. Therefore, the respondents were approached randomly online and participated in the study on a voluntary basis. As a result, a total of 10 respondents willingly took part in the evaluation activity. The post-task questionnaire, consisting of 28 items in two sections, was posted online using Google Form. Section A is about the respondents' demographic information, while Section B determines the usability of the application using a five-point Likert scale, in which one represents strongly disagree and five represents strongly agree. The respondents performed the following step-by-step procedure for the evaluation: (1) signed a consent form with the help of their relatives, (2) interacted

with *Belajar SenangJer* app as stated in the experiment procedure, and (3) answered the post-task questionnaire.
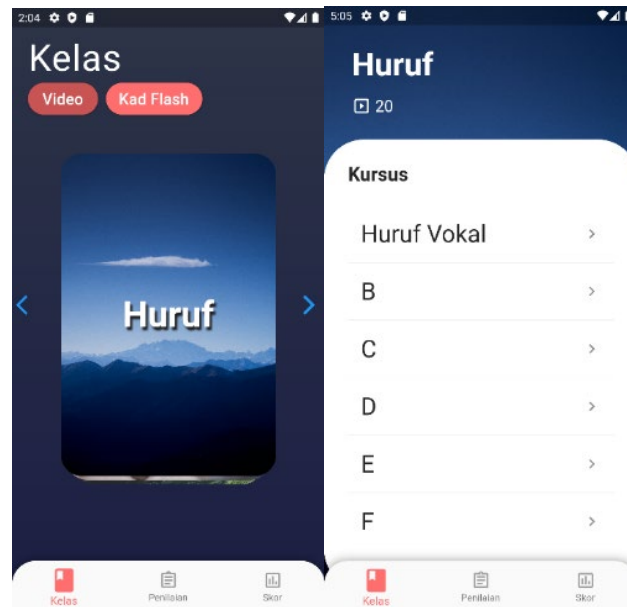

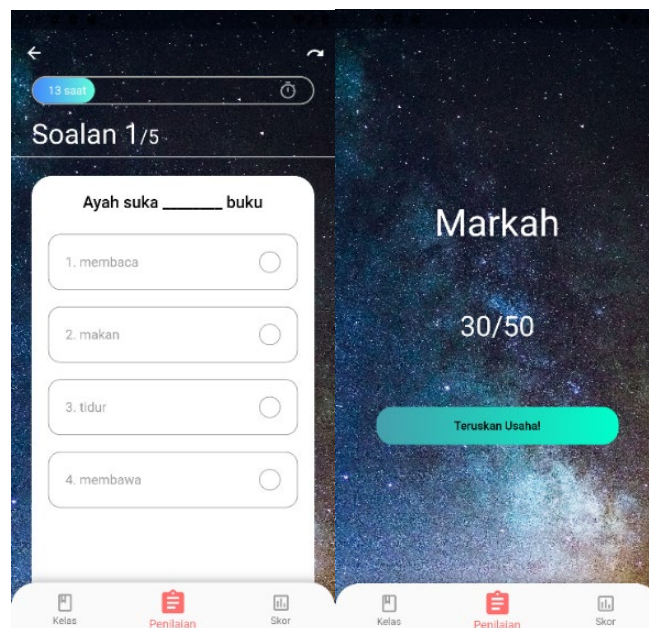**Figure 4: The interface for the main page of a lesson (left) and the detail page (right)**

Figure 5: The interface for assessment (left) and current score (right)

The demographic analysis reveals that most of the respondents are female (60.0%) and aged between 61 to 70 years old (50.0%). However, the number of those owning a smartphone is fairly distributed among those who do not (50.0%). Those without a smartphone usually share with others. Similarly, 50.0% of them use smartphones occasionally and 30.0% never used smartphones before. More interestingly, almost all (90.0%) never heard of an educational mobile application, whilst each one of them never use any of such applications before. The analyses performed on the responses gathered from Section B indicate that all respondents agreed that the application is useful even though only half (50.0%) admitted the ease of use and 70.0% were satisfied.

5. Conclusion and Future Work

In conclusion, this paper described the development of a mobile application prototype, *Belajar SenangJer*, for illiterate indigenous adults to improve reading, writing, and recognizing the structure of the Malay language. The outcomes of the usability evaluation suggest that the application is useful as it contains valuable information to learn Malay language. The application allows users to learn Malay language from flashcards and videos. Users also have the opportunity to sit for an assessment and check their scores after completion. However, the user-friendliness feature may need to be improved as some of the respondents stated that it is rather difficult for them to memorize the procedure of using the application. In addition, the user interface of *Belajar SenangJer* could be enhanced by providing a voice guidance function and matching games. The application could benefit more users by adding other languages, such as English and Mandarin.

Acknowledgement

References

[1]   S. Montoya, "Defining literacy," UNESCO, Hamburg, Germany, 2018.

[2]   M. Roser and E. Ortiz-Ospina, "Literacy," Our World in Data, 2018.

[3]   M. A. Abas, S. W. Lee, N. H. Hassin, and M. F. M. Amin, "Community development model for poverty eradication of indigenous people in Malaysia", 2020.

[4]   N. Sharma, "How Mobile Education Apps Are Improving Education System In The World?," eLearning Industry, 22 June 2019. [Online]. Available: https://elearningindustry.com/mobile-education-apps-improving-education-system-world. [Accessed 17 November 2020].

[5]   J. Müller, "Number of smartphone users in Malaysia from 2015 to 2025 (in millions)," statista, July 2020. [Online]. Available: https://www.statista.com/statistics/494587/smartphone-users-in-malaysia/. [Accessed 15 November 2020].

[6]   G. L. Khor and Z. M. Shariff, "Do not neglect the indigenous peoples when reporting health and nutrition issues of the socio-economically disadvantaged populations in Malaysia," BMC Public Health, 2019.

[7]   M. R. Rosnon and M. A. Talib, "Indigenous Education Rights: The Malaysian Case," International Journal of Academic Research in Business and Social Sciences, vol. 9, no. 10, pp. 149-167, 2019.

[8]   G. E. Iyawa, "Personal Extreme Programming: Exploring Developers' Adoption," AMCIS 2020 Proceedings, 2020.

[9]   R. Agarwal, "Extreme programming for a single person team," ACM-SE 46: Proceedings of the 46th Annual Southeast Regional Conference on XX, p. 82–87, 2008.

[10]   A. Sergeev, "Life Cycle of Extreme Programming," HYGGER, 23 May 2016. [Online]. Available: https://hygger.io/blog/life-cycle-of-extreme-programming/. [Accessed 17 November 2020].