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Development of DelTalk (an English Learning Application) Using Agile Method

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ABSTRACT

English has become a world language that must be mastered by many people because English has dominated the era of communication to connect and transfer knowledge to the entire world. When it comes to the development of mobile applications for language learning, previous research has tended to emphasize testing on various technologies such as multimedia, virtual and augmented reality, conversational agents and artificial intelligence-based systems. This research, therefore, aimed to develop a mobile-based English learning application that provided English learning in the form of stories called Deltalk. This mobile-based English learning application provides features in which the users can practice their speaking in English. This app was developed by integrating ASR (Automatic Speech Recognition) technology provided by NOVO Learning. The ASR was integrated with Deltalk through the API (Application Programming Interface) and Websocket. Deltalk development adapted two agile frameworks, including Scrum and Lean Software Development by performing MVP process one time.

1. INTRODUCTION

The development of information technology has affected various aspects of people's lives such as art, politics, culture, and education is no exception. The accelerated pace of globalization has facilitated the influx of foreign cultures into Indonesia and, in turn, poses

the risk of future generations losing touch with their own heritage, even from an early age, potentially impacting the nation's next generation [1], [2]. Over the last few years, mobile applications are no longer limited to communication purposes but are increasingly being used as important learning tools at all levels of education [3]–[5]. Advances in mobile application technology have led to digital-based learning so that it can happen anytime and anywhere. In Indonesia, mobile application users have entered the world of children. This is a challenge for parents and educators who are responsible for children's education. Mobile applications are considered effective as educational media for children because they are more practical and attractive, especially in Android-based mobile applications [6].

English has become a world language that must be mastered by many people because English has dominated the era of communication to connect and transfer knowledge to the entire world [7]. When it comes to the development of mobile applications for language learning, previous research tended to emphasize testing on various technologies such as multimedia, virtual and augmented reality, conversational agents and artificial intelligence-based systems [8]. The results of the study [9] showed that mobile-based learning media can be applied in learning English and improving student learning outcomes. Mobile applications empower English education because they are seen as a medium that provides a large amount of information to students that teachers may not be able to supply [10].

Against this background, we were interested in creating a mobile-based English learning application that provides English learning in the form of stories called *Deltalk.* This mobile-based English learning application provides features in which the users can practice their speaking in English. This app was developed by integrating ASR (Automatic Speech Recognition) technology provided by *NOVO Learning*. The ASR was integrated with Deltalk through the API (Application Programming Interface) and Websocket.

Deltalk was developed using the *Agile* method. *Agile* is a software development method based on iterative or repetitive work, where rules and solutions that have been agreed upon by each team member are carried out in a structured and organized collaboration [11]–[13]. There were several reasons why *Agile* was used in *Deltalk* development. The first reason is to do with productivity. Each team that has a different role can carry out their respective tasks without having to wait for the other team to complete their tasks because the tasks given are well structured during discussions and are carried out in parallel. The second reason is to do with communication: *Agile* places great emphasis on good communication between all parties involved in application development. Among the development team, design, testing and the client, intensive communication is needed within the agreed timeframe. This method is able to handle changes well and is flexible from start to finish of development. The last reason is that the targeted development time with this method is relatively fast because all teams work in parallel and problems that become obstacles are always discussed together to find solutions that are fast and good.

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DelTalk development was not purely agile. The development of this application adapted two agile frameworks, namely *Scrum* and *Lean Software Development*. *Scrum* is a framework of software development methods with an iterative concept, namely *agile* [14], [15]. Scrum is divided into three roles: *Product Owner, Scrum Master*, and *Development Team*. The *product owner* has the task of managing affairs with Stakeholders while the *Scrum Master* takes care of the internal part of the team and Development Team is in charge of project workmanship techniques and more detailed discussions. The *Scrum* method starts with a project discussion between the product owner and the relevant stakeholders, and then Scrum master and development teams are formed. When using the Scrum framework, the team must use the sprint method which is useful for creating a time limit that contains a predetermined work period and contains items or events that each team member will work on within a certain period of time. In this method, there is also a daily scrum which is held in meetings per working day of around 15 minutes to synchronize progress, discuss problems and solutions so that each process is always on time. Lean Software Development is an agile method for developing applications using minimal resources and launching applications with limited features called Minimum Viable Product (MVP) [16], [17]. MVP is a product with basic and not very advanced features but has high functionality. In *Deltalk* development, the main goal of using MVP lies in fast product launch times, testing on real users, user feedback so that the risk of product feature failure can be minimized and save costs.

2. RESEARCH METHOD

DelTalk was developed using the *Agile methodology*. According to [18], Agile Developments methods are a group of software development methodologies that are based on the same principles or it can be said that system development in the short term requires rapid adaptation of developers to changes in any form. *Agile Developments methods* are fast, light, free to move and alert. In the development process, *Agile* is done in iterations. *Agile methodology* consists of several models including *Extreme Programming (XP), Adaptive Software Development (ASD), Dynamic Systems Development Method (DSDM), Scrum, Crystal, Feature Driven Development (FDD), and Agile Modeling (AM)* [19]. DelTalk development focused on using the *Extreme Programming (XP)* model with the steps shown in Figure 1:

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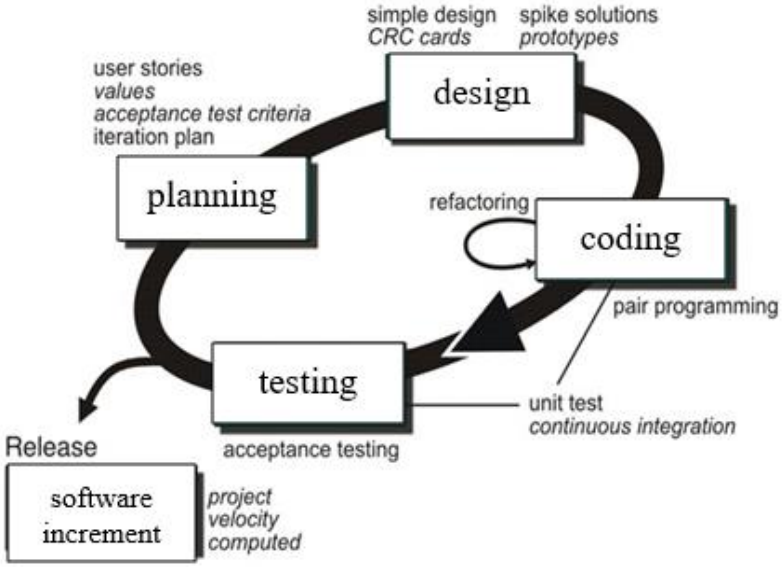

Figure. 1. Step of extreme programming [20].

3. RESULTS AND DISCUSSION

In this stage, the researchers performed all the stages of *Agile* method. Each stage was performed with the aim of achieving user satisfaction in using *DelTalk.*

3.1. Planning

The Planning Stage is the initial stage of data collection which was the reference for the development of *Deltalk* App with 1 MVP. In this stage, the researcher gathered and analyzed the non-functional and functional requirements of the users. These requirements were gathered using a questionnaire. The questionnaire was distributed to children who were currently studying at the elementary school (SD) and junior high school (SMP). The questionnaire consisted of two parts, namely the demographic and preference sections. Demographics section dealt with respondent identity while preference section was about respondents preferences of the English reading application. The questionnaire was distributed through social media such as *Instagram, WhatsApp and Telegram*.

3.2 Design

Figure 2 shows the Use Case Diagram of the development of the interface of *DelTalk.*

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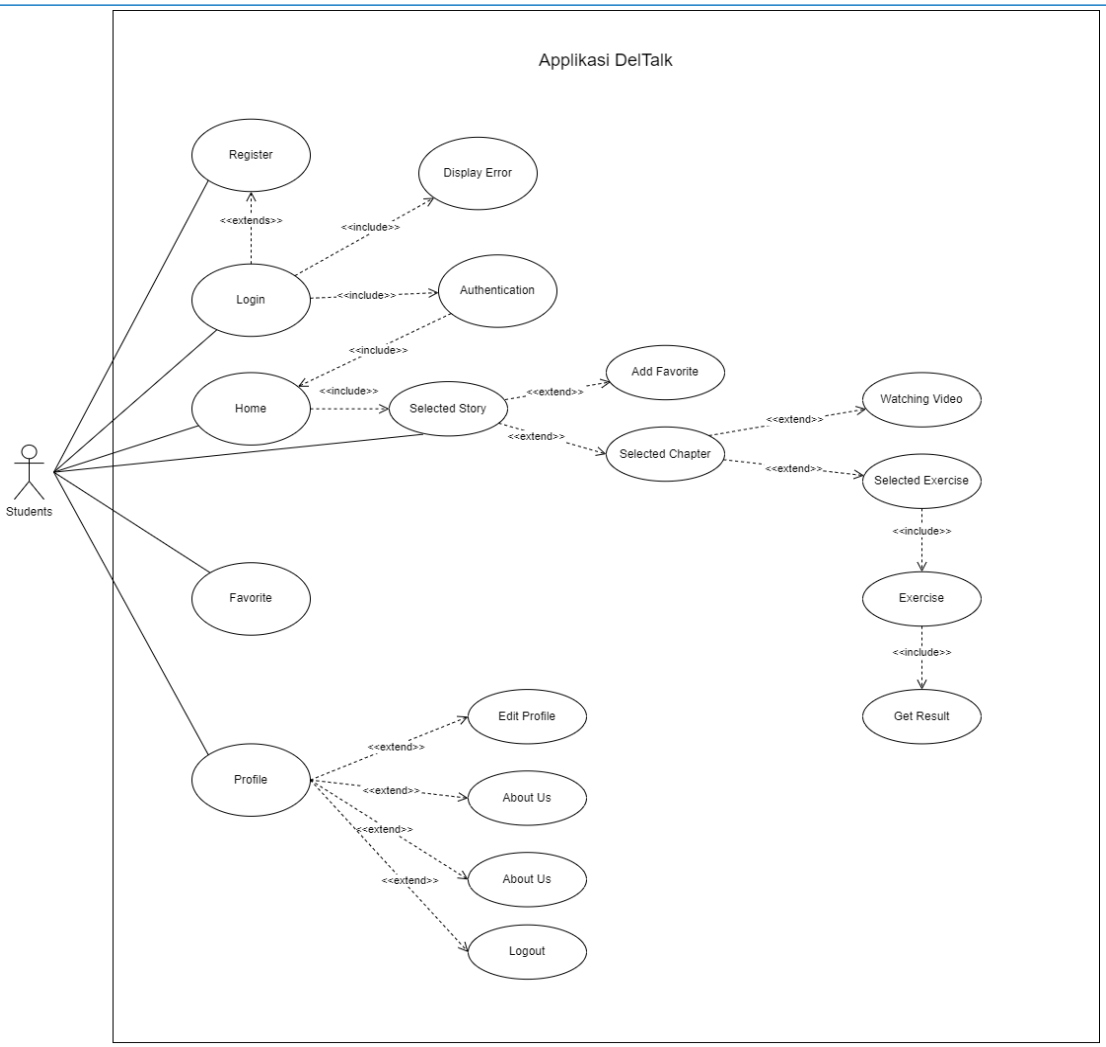

Figure 2. Use Case Diagram of the interface development of *Deltalk*

The followings are the explanations of the Use Case Diagram shown in figure 2:

- Student: Users who can access the application or use *DelTalk* application, starting from logging into the application to performing actions on the application such as doing exercises, watching videos, accessing books, editing profiles and others.
- Register: The initial step taken by the user when the user does not have an account to access *DelTalk* application
- Login: After the user registers his account, the user must log into the application to access some of the features in *DelTalk* application. The authentication process is needed in the application where the system can limit who is allowed to enter the user's remote access network. If the account has not been validated, an error display will be displayed.
- Home: When the user has logged into the application, the user can access several books on the home page.

- Selected Story: An activity carried out by the user after accessing one of the stories to be read. In this activity the user can select a list of chapters to be read and can also add books as favorite books.
- Selected Chapter: An activity carried out by the user to select the exercise that will be read and executed. In this activity, users can also watch stories from videos for each chapter available in a book.
- Selected Exercise: An activity carried out by the user after accessing one of the chapters he wants to read and in this activity, the user will be brought by the system to the exercise page.
- Exercise: *Exercise* functions to train the user to hear how to pronounce a word, several words or sentences from the button speaker provided based on the illustration provided. Then, the user can check the answers given by being able to record sound.
- Get Result: At the end of the exercise, the user will get the results of all the exercises the user has done regarding the accuracy of the pronunciation of the words spoken during the exercise.
- Favorite: To save a list of storybooks that the user likes on the favorites page so that accessing stories becomes faster.
- Profile: An activity carried out by the user to change user data such as name, email, password settings and others. Then the user can access *About Us* to view the profile of DelTalk application and also access the FAQ to view a list of questions that are frequently asked by users when using the application, along with the answers.

Figure 3 shows the Class Diagram of the development of *DelTalk.*

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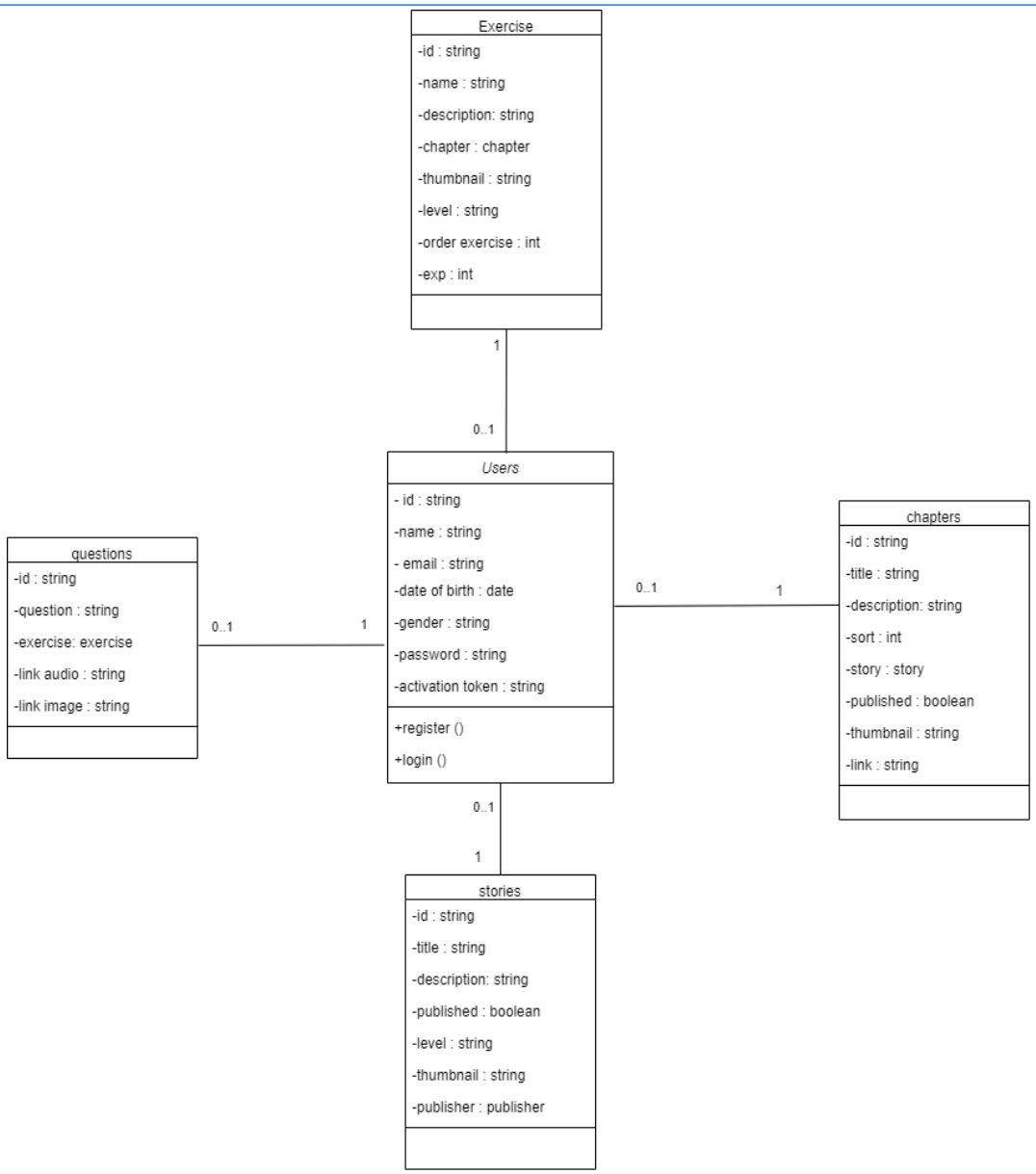

Figure 3. Class Diagram of DelTalk

3.3 Coding

At the coding stage, coding was carried out to build DelTalk mobile application. The development of this DelTalk mobile application used *Kotlin*. The following is the building of DelTalk mobile application with MVP, done one time:

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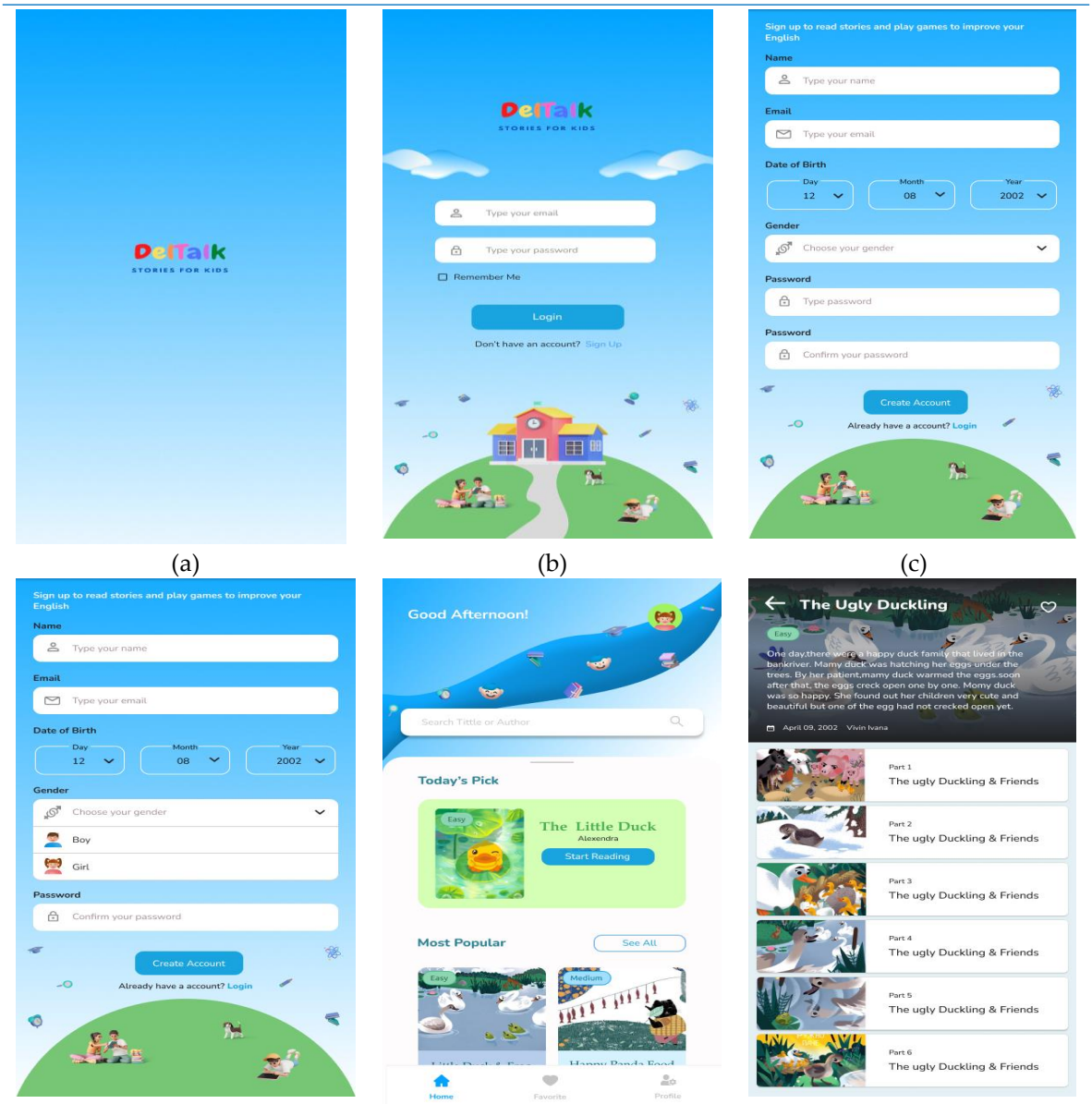

(a) (b) (c)

(d) (e) (f)

Figure 4. The implementation of (a) Splash Screen, (b) Login, (c) Registration, (d) Gender, (e) Home, and (f) Chapter

Figure 4 (a) is the Splash Screen of DelTalk application when it is first opened. Deltalk application builds *login* (Figure 4(b)) and *register* (Figure 4(c-d)) and authorization system for users. The authentication process is required in Deltalk application where the system can limit who is allowed to enter the user's remote access network. To meet these needs, users who wish to access a network remotely must first be identified with authentication. Figures (f) and (e) are the *Home screen* and the user can choose the story they

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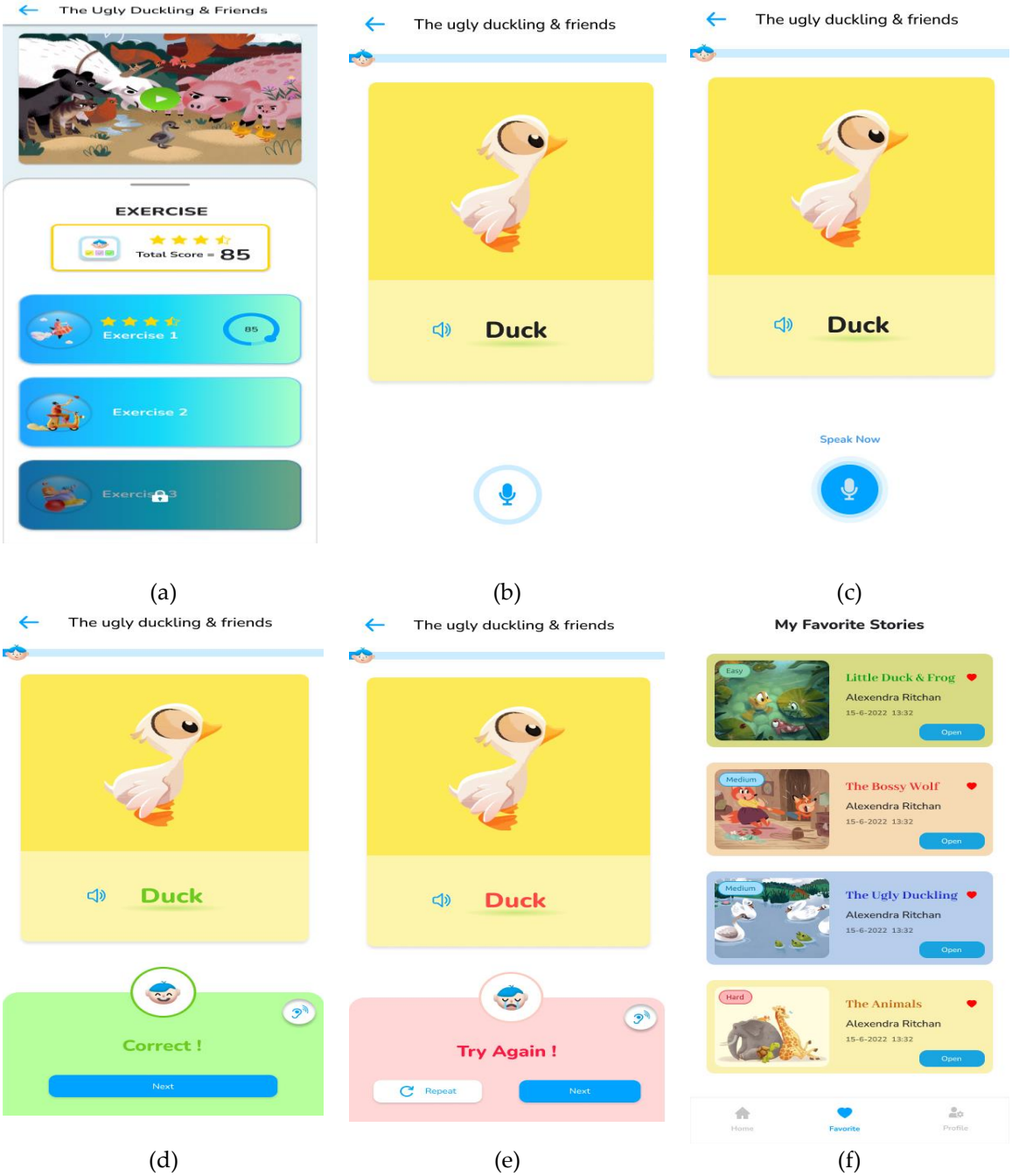
want to read. DelTalk application provides services for users to be able to watch stories from videos for every chapter available in a book. With the visuals and audio provided by DelTalk application, the app allows users to increase their vocabulary and improve their English pronunciation skills.



(a) (b) (c)

(d) (e) (f)

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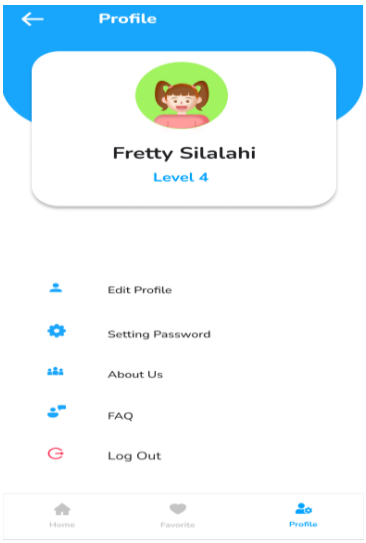
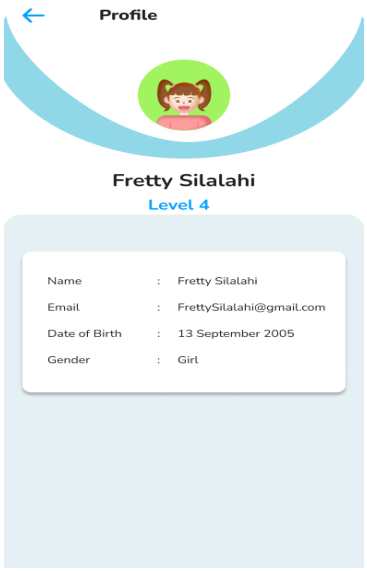
Figure 5. The implementation of (a) Selected Question, (b) First page of Exercise, (c) Exercise starts to Record, (d) Exercise Response Correct, (e) Exercise Response False, and (f) Favorite on *Deltalk* app

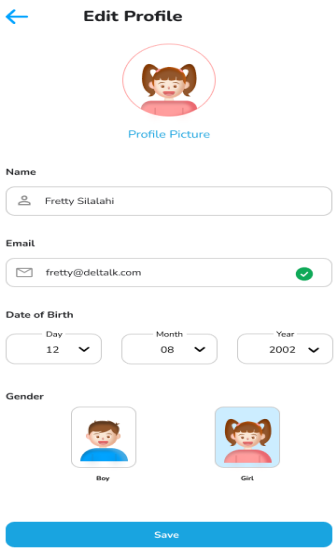
DelTalk application provides an *Exercise* feature (Figure 5 (a)-(b)) where the user can hear how to pronounce a word, several words or sentences from the button speaker provided based on the illustration provided (Figure 5 (c)). Then, the user can check the answers given by being able to record sound and the system will check the results of the recorded words or sentences given (Figure 5 (d)-(e)). Figure 5 (f) is *favorite* feature: if a user likes a story in DelTalk application, the user can add the story to the favorites list.



(a)



(b)



(c)

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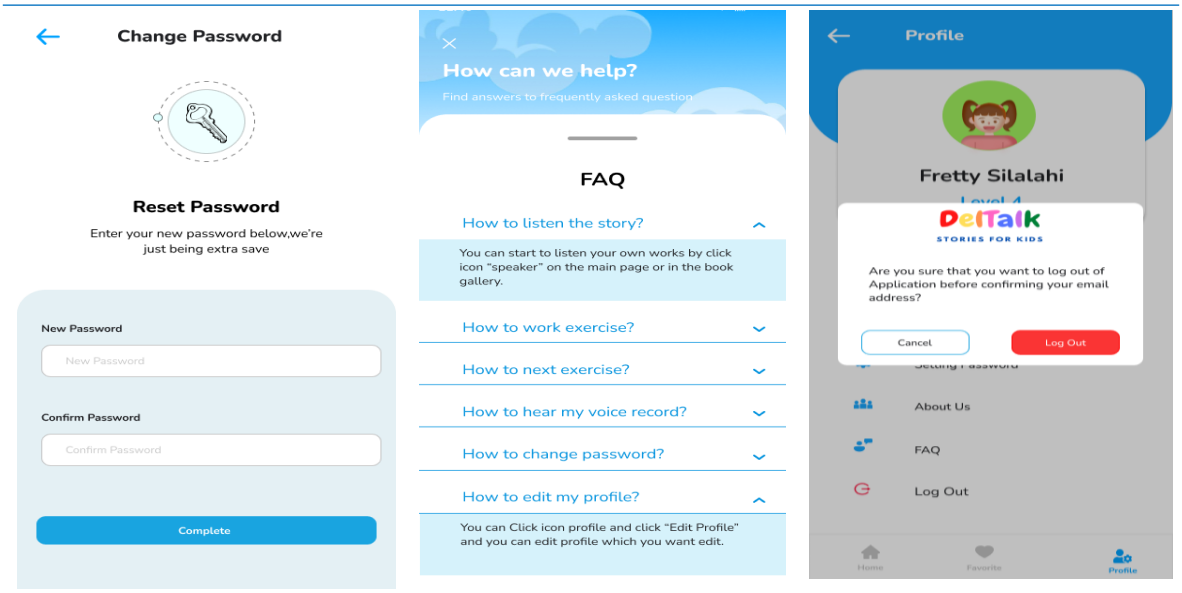

(d) (e) (f)

Figure 6. The implementation of (a) Profile, (b) Detail Profile, (c) Edit Profile, (d) Change Password, (e) FAQ, and (f) Logout on Deltalk app

Figure 6 (a) is the implementation of the *user profile* on *Deltalk*, consisting of 4 main parts. These parts include *profile details* (Figure 6 (b) where users can see the profile details they have; *edit profile* (Figure 6 (c) where users can edit data (Name, Email, Date Of Birth) and Gender) from the user; *change password* (Figure 6 (d) where the user can change the password for Deltalk application account from the user; and *FAQ* (Figure 6 (e) where the user can see a list containing questions that are frequently asked by consumers or the user while using DelTalk application, along with the answers. Figure 6 (f) is the implementation of the *logout* if the user wants to logout from DelTalk application.

3.4 Testing

In this Delltalk development, the testing scenarios are shown in Table 1:

Table 1. The testing scenarios of *Deltalk* development

Module	ID Test Scenario	Function	ID Test Case	Test Case Name
Login Page	DT-01	The user logs in or is directed to register	DT-01-1	The user is successful to get to the registration page
			DT-01-2	The user successfully logs in
Register	DT-02	The users can register	DT-02-1	The user successfully registers with a valid email

Home Page	DT-03	Users can access the content available on the home page	DT-03-1	The user successfully searches for the title of the story
			DT-03-2	Each story can be unlocked
			DT-03-3	The *All story* button can work
			DT-03-4	The *today's pick* feature successfully appears on the home page
			DT-03-5	Reading stories from today's pick
Favorite Page	DT-04	Contains a collection of favorite stories	DT-04-1	The user's favorite stories appear on the favorites page
			DT-04-2	The user removes the favorite mark on the story
Profile Page	DT-05	Detail data user, edit profile, about us, faq and log out	DT-05-1	The user manages to see the profile details
			DT-05-2	The user manages to edit the profile
			DT-05-3	Successfully displays the about us page
			DT-05-4	Successfully displays the FAQ Page
			DT-05-5	The user manages to log out
User Exercise Story	DT-06	Users can watch videos and practice pronounce to the final level	DT-06-1	The user manages to watch exercise videos
			DT-06-2	The user manages to open each story
			DT-06-3	The user manages to perform the pronoun exercise
			DT-06-4	The user manages to reached the final level

Certainly, here are the findings from the tests and their respective solutions to prevent the issues:

1. Finding: During the testing of the Login Page (DT-01-1), some users faced difficulties navigating to the registration page.
   Solution: To prevent this issue, consider enhancing the user interface and providing clearer navigation instructions for first-time users. Ensure that the registration option is prominently displayed and easily accessible.
2. Finding: In the Home Page (DT-03-4), the "today's pick" feature did not consistently appear on the home page.
   Solution: To ensure the consistent appearance of the "today's pick" feature, review the data sources and scripts responsible for its content. Implement error handling and

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fallback mechanisms to display alternative content if the "today's pick" feature is unavailable.

These findings and their corresponding solutions should be thoroughly addressed during the development and testing process to enhance the user experience and overall functionality of Deltalk application.

3.5 Discussion

The development of *Deltalk* app used MVP one time. The MVP focuses on integrating ASR technology and creating multiple stories on *DelTalk* application. This first MVP has been completed and has been tested on real users. Testing was carried out through the User Experience Test to children around 6 - 15 years. At this stage, children can see stories and interact by saying the words provided by *Deltalk* application, get corrections from the user's speech and get an assessment based on what they said. However, children still cannot choose a different story because the data provided was still local dummy data. The application also cannot distinguish one child from another because there is no user account system at this stage. Through the problems and feedback obtained from the *User Experience Test*, we suggest that for further development that there will be a second MVP that focuses on adding features, implementing the API and redesigning the appearance of the user interface. The added features include an authentication system and account authorization so that users who use this application can have their own account. Furthermore, the story which was originally still using a local database was changed to using a remote database connected via the API. Stories can also be searched by title or story description. The favorite feature is also added to the application. Users can save the stories they like on the favorites page, so accessing stories is faster. There is also a profile feature, in which user can change their personal data such as gender, profile picture and identity. When doing an exercise, the user no longer needs to press the record button again and again to stop sound recording. Improvements have been made: when the user records voice, the application can detect when the user has finished speaking and stop the recording process automatically.

4. CONCLUSION

We have successfully developed Deltalk application, a mobile-based English learning platform that offers a unique approach to language acquisition through storytelling. This innovative app empowers users to practice and enhance their English speaking skills. The integration of ASR (Automatic Speech Recognition) technology, provided by NOVO Learning, has been a key component of Deltalk's functionality. ASR has seamlessly been incorporated into Deltalk through the utilization of APIs and Websockets. Throughout the development process, Deltalk adopted a combination of agile frameworks, including Scrum and Lean Software Development, and implemented the Minimum Viable Product (MVP) process. The initial MVP phase involved real user testing, specifically with

children aged 6-15, through the User Experience Test. The insights gathered from this testing phase highlighted the need for substantial reengineering and expansion of the application's features.

To address the identified limitations and enhance the user experience, a second MVP is deemed necessary. This upcoming phase will focus on feature enrichment, API integration, and a comprehensive redesign of the user interface. Planned enhancements encompass the introduction of an authentication system, account authorization, remote database connectivity, search functionality, a favorites feature, and user profile customization. Furthermore, it will streamline the user experience during language exercises by automating voice recording termination. As we move forward, it is crucial to recognize the significant potential of Deltalk as an English language learning tool. The second MVP and continued research will play a pivotal role in refining and expanding the application's capabilities, ensuring it meets the evolving needs of its users and remains an effective platform for language acquisition.

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REFERENCES

[1] R. Harpiyani *et al.*, "Development of 'Love the Motherland' Digital Storybook for Early Childhood," *Jurnal Teknologi Informasi dan Pendidikan*, vol. 15, no. 2, pp. 38–50, Nov. 2022, doi: 10.24036/JTIP.V15I2.605.
[2] Y. Y. Sahria, N. Azizah, G. S. Zidni, and N. I. Febriarini, "Design Media Interactive of Mobile Augmented Reality (AR) in Education for Health Learning," *Jurnal Teknologi Informasi dan Pendidikan*, vol. 15, no. 2, pp. 147–159, Mar. 2022, doi: 10.24036/JTIP.V15I2.648.
[3] H. Crompton and D. Burke, "The use of mobile learning in higher education: A systematic review," *Comput Educ*, vol. 123, pp. 53–64, Aug. 2018, doi: 10.1016/J.COMPEDU.2018.04.007.
[4] C. R. Heil, J. S. Wu, J. J. Lee, and T. Schmidt, "A Review of Mobile Language Learning Applications: Trends, Challenges, and Opportunities," *The EuroCALL Review*, vol. 24, no. 2, pp. 32–50, Sep. 2016, doi: 10.4995/EUROCALL.2016.6402.
[5] T. Rajendran and M. Md. Yunus, "Chatterpix Kids: A Potential Mobile App for Helping Primary ESL Pupils Improve Their Speaking Fluency," *International Journal of Learning, Teaching and Educational Research*, vol. 20, no. 4, pp. 18–42, May 2021, doi: 10.26803/IJLTER.20.4.2.
[6] M. M. Zatulifa, R. Riswandi, H. Fitriawan, and A. Akla, "Application Based Android As A Development Of English Learning Media," *undefined*, 2018.
[7] N. Dwiyani and Y. Huda, "Android Application for Testing English Proficiency," *Jurnal Teknologi Informasi dan Pendidikan*, vol. 16, no. 1, pp. 1–13, May 2023, doi: 10.24036/JTIP.V16I1.704.
[8] K.-M. Chuah and M. K. Kabilan, "The Development of Mobile Applications for Language Learning: A Systematic Review of Theoretical Frameworks," *International Journal of Learning, Teaching and Educational Research*, vol. 21, no. 8, pp. 253–270, Sep. 2022, doi: 10.26803/IJLTER.21.8.15.

P.ISSN: 2086 – 4981
E.ISSN: 2620 – 6390
tip.ppj.unp.ac.id

[9] A. Setiadi, P. Yuliatmojo, and D. Nurhidayat, "Pengembangan Aplikasi Android Untuk Pembelajaran Pneumatik," *Jurnal Pendidikan Vokasional Teknik Elektronika (JVoTE)*, vol. 1, no. 1, pp. 1–5, Apr. 2018, doi: 10.21009/JVOTE.V1I1.6886.
[10] N. Anggrarini and I. Yulianawati, "Exploring Mobile Application and Their Usage In English Language Learning," *Wiralodra English Journal*, vol. 4, no. 2, pp. 52–66, Oct. 2020, doi: 10.31943/WEJ.V4I2.112.
[11] J. F. Tripp, C. K. Riemenschneider, and J. B. Thatcher, "Job Satisfaction in Agile Development Teams: Agile Development as Work Redesign," *J Assoc Inf Syst*, vol. 17, no. 4, p. 1, Apr. 2016, doi: 10.17705/1jais.00426.
[12] S. Al-Saqqa, S. Sawalha, and H. Abdelnabi, "Agile Software Development: Methodologies and Trends," *International Journal of Interactive Mobile Technologies (iJIM)*, vol. 14, no. 11, pp. 246–270, Jul. 2020, doi: 10.3991/IJIM.V14I11.13269.
[13] I. K. Kirpitsas and T. P. Pachidis, "Evolution towards Hybrid Software Development Methods and Information Systems Audit Challenges," *Software 2022, Vol. 1, Pages 316-363*, vol. 1, no. 3, pp. 316–363, Aug. 2022, doi: 10.3390/SOFTWARE1030015.
[14] W. Zayat and O. Senvar, "Framework Study for Agile Software Development Via Scrum and Kanban," *https://doi.org/10.1142/S0219877020300025*, vol. 17, no. 4, Jul. 2020, doi: 10.1142/S0219877020300025.
[15] M. Barbareschi, S. Barone, R. Carbone, and V. Casola, "Scrum for safety: an agile methodology for safety-critical software systems," *Software Quality Journal*, pp. 1–22, Jul. 2022, doi: 10.1007/S11219-022-09593-2/TABLES/2.
[16] V. Lenarduzzi and D. Taibi, "MVP Explained: A Systematic Mapping Study on the Definitions of Minimal Viable Product," *Proceedings - 42nd Euromicro Conference on Software Engineering and Advanced Applications, SEAA 2016*, pp. 112–119, Oct. 2016, doi: 10.1109/SEAA.2016.56.
[17] C. Reidl and D. Valtiner, "Using MVP in Hardware Industry – Reduce 'Time to Market' by Taking Risks," *Journal of Advanced Management Science*, pp. 83–87, 2021, doi: 10.18178/JOAMS.9.4.83-87.
[18] S. Widayati *et al.*, "Penerapan Metode Agile Process dengan Model Extreme Programming Dalam Pembuatan Game RPG 'The Realm of Unknown' Menggunakan MV RPG Maker," *Jurnal Esensi Infokom : Jurnal Esensi Sistem Informasi dan Sistem Komputer*, vol. 6, no. 1, pp. 51–58, May 2022, doi: 10.55886/INFOKOM.V6I1.456.
[19] J. Silitonga, M. Alfredo, R. Lumbantoruan, F. Simanjuntak, and T. Arifin Prasetyo, "Developtment Of Vaccine Tracking Application Using Agile Methodology," *Klik - Kumpulan Jurnal Ilmu Komputer*, vol. 9, no. 3, pp. 416–426, Oct. 2022, Accessed: Nov. 16, 2022. [Online]. Available: http://klik.ulm.ac.id/index.php/klik/article/view/504
[20] "Perancangan Aplikasi Resep Makanan Traditional Indonesia Menggunakan Pendekatan Agile Process Dengan Model Extreme Programming Berbasis Android | Proceeding Seminar Nasional APTIKOM 2016." Accessed: Nov. 16, 2022. [Online]. Available: https://journal.universitasbumigora.ac.id/index.php/semnastikom2016/article/view/103