Design and Development of Mobile Application in Indonesian Language Learning For Foreign Speakers Level A1

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Abstract. This paper describes about the design and development of Android mobile platform application in the learning of Indonesian Language for Foreign Speakers as the term used Bahasa Indonesia bagi Penutur Asing or as abbreviated BIPA. The Android Studio is used to create and set up a set of application programming interfaces (APIs) and Kernel Linux Platform. The interface program was designed to give effectiveness and flexibilities required in the process of learning. The program code was written and installed in the users Smart Phone. The official language programming used for Android development is Java to make the program running easily for the users to use the application because the mobile application does not use many resources. Once the application was ready, then installed into various types of Smart Phone with various Android platforms, and tested. The program was tested to BIPA foreign students who were learning BIPA Level A1 to see if the program ran well. This aimed to test its effectiveness and impact. The data of pre-test and interview were collected from foreign students who have already learned Indonesian language before and who were never in order to see the baseline of respondents competencies. Pre-test, Post-test and interview test scores were compared to see if there was an increase in respondents competencies. The research findings shows that there was a significant increase on the foreign students’ skills. The increase on the written test through pre-test and post-test showed by 30% and 18 % on the interview. In contrast, the most significant increase was occurred in the group of students who never learned before. This increase showed by 56%, whereas the increase in the group of foreign students who have already learned Indonesian language showed by 12%. Furthermore, this increase significantly also occurred in interview at 32% to the group of foreign students who never learned Indonesian language before and 8% to the group of foreign students who already learned Indonesian language. This findings shows that Mobile Application provides effectiveness, efficiency, flexibilities, and accelerated learning to the group of foreign speakers who never learned BIPA before.

1. Introduction
Bahasa Indonesia is the official language used in the country of Republic of Indonesia [15]. In promoting the Indonesian language to foreign speakers, Bahasa Indonesia bagi Penutur Asing and abbreviated as BIPA has been spoken by foreign speakers from different countries who work in Indonesia or study at the Universities in Indonesia with different programs. Darmasiswa Republic of Indonesia is a Scholarship Program offered by the government of Republic of Indonesia under the Ministry of Education and Culture since 1974 to learn BIPA and culture. The Ministry of
Education and Culture of Republic of Indonesia yearly provides scholarship for foreign students who have interests to study Indonesian language (BIPA) and culture, and stay in Indonesia for the period of 12 months. The Darmasiswa Program has increased foreign students to learn BIPA since then. This has shown many foreign students’ interest to apply and get the Scholarship. The data of foreign speakers who used BIPA for different purposes is as follows:

| Year | Descriptions | Spoke person |
|------|--------------|--------------|
| 2009 | Indonesia language becomes the second language in Ho Chi Minh City, Vietnam, | Ahmad, Irdamis, The Consul General Republic of Indonesia in Ho Chi Minh City [1]. |
| 2016 | 10 Bahasa yang Paling Banyak Digunakan di Dunia. | http://dewara.com/10-bahasa-yang-paling-banyak-digunakan-di-dunia/[4]. |
| 2016 | Program Prioritas Badan Pengembangan dan Pembinaan Bahasa: 8 BIPA Learning Centers in ASEAN Regional: Phillipines, Vietnam, Thailand, Singapura, Kambodja, Miyanmar, Laos, Timor Leste; 13 BIPA Learning Centers in the World: USA, South America, Netherlands, Italy, French, Bulgaria, Germany, Russia, UK, Poland, azerbaijan, Japan, Iraq | https://studylibid.com/doc/472895/160222-program-prioritas-badan-bahasa [9]. |
| 2016 | 581 Mahasiswa Asing Ikut Program Darmasiswa di Indonesia (581 foreign students from 74 countries selected to join Darmasiswa RI Program Scholarship from Ministry Education and Culture to learn BIPA and Culture within the Academic Year 2016/2017). | https://republika.co.id/berita/pendidikan/dunia-kampus/16/08/31/ocqzko368-581-mahasiswa-asing-ikut-program-darmasiswa-di-indonesia [8]. |
| 2017 | 74,000 Foreign workers worked in Indonesia. | Dhakiri, Muhammad Hanif. Ministry of Manpower Republic of Indonesia [5]. |
| 2017 | 637 Mahasiswa Asing Belajar Budaya Indonesia Melalui Darmasiswa (673 students from 96 countries learn BIPA through the Darmasiswa RI Scholarship from Ministry of Education and Culture Republic of Indonesia to study BIPA and culture within the Academic Year 2017/2018. | https://www.kemdikbud.go.id/main/blog/2017/08/637-mahasiswa-asing-belajar-budaya-indonesia-melalui-darmasiswa-2017 [10]. |
Kemendikbud Berikan Pembekalan Kepada 679 Peserta Program Darmasiswa Tahun Akademik 2018/2019 (679 foreign students from 94 countries selected to join Darmasiswa RI Program Scholarship from Ministry Education and Culture to learn BIPA and Culture).

https://www.kemdikbud.go.id/main/blog/2018/08/kemendikbud-berikan-pembekalan-kepada-679-peserta-program-darmasiswa-tahun-akademik-20182019 [11].

1 Foreign student of Darmasiswa Republic Indonesia Scholarship Program who studied Indonesian language for Foreign Speakers (BIPA) in the Admission intake of Academic Year 2017/2018 at Politeknik Negeri Medan.

2 Foreign students of Darmasiswa Republic Indonesia Scholarship Program who studied Indonesian language for Foreign Speakers (BIPA) in the Admission intake of Academic Year 2018/2019 at Politeknik Negeri Medan.

Table 1: Data of Foreign Learners learning of BIPA

With reference to the above data of foreign learners who learned BIPA increased significantly including at Politeknik Negeri Medan, however the teaching methodology applied in Politeknik Negeri Medan was still in traditional way and some of the teaching staff of BIPA have not been well trained. This resulted that the low output was contributed due to the conventional teaching and face-to-face learning method used and shortage well trained staff. Therefore there is an urgency to design and develop the Mobile Platform Application, so the learning can be more easy, effective, efficient and learners can have more flexible time to study out of the regular class.

Research Question

- How the Mobile Application Design and Development are created by using the Android Studio?
- How are the Learning Materials of Indonesian language for Foreign Speakers (BIPA) at Level A1 imported into the application in order to run on?

Scope of the Research

- Design and Development of Mobile Application using Android Studio;
- Learning materials of Indonesian language are installed into the Mobile Application. The materials referred to the 4 skills are: (1) reading, (2) writing, (3) listening (4) speaking. The topics include (1) Introductions (self-introduction and introducing someone to others); (2) Identity; (3) Physical Appearance; (4) Family; (5) Daily Activities; (6) Hobby; (7) Communication; (8) Transportation; (9) Buying and Selling.
Purpose of the Research

- To create Mobile Application for Indonesian Language Learning (BIPA) Level A1.

Advantage of the Research

- To disseminate Indonesian language as the national pride to the world;
- To provide flexibilities in the process of Indonesian language learning;
- To make the learning of Indonesian language easier and more effective using the mobile application program installed in their Smart Phone;
- To provide acceleration to the learning process of Indonesian language.
2. Literary Review

- Application Design System
- Mobile Application
- Android
- Android Studio Development
- Mobile Application Design Development
- Indonesian language learning for foreign speakers at level A1.

2.1. Application Design System

The design system of Mobile Application Development is built through the Rapid Application Development (RAD) approach, because this system is simple and the duration of the development is short. Design System is a process of developing a new specification based on the recommendation of analysis result system, Subhan [13]. So, we can say design system is a new specification that describe about stages in details of the process analysis system.

2.2. Mobile Application

Mobile application is a system consists of software/set of program that runs on a mobile device and performs certain tasks for the user which is equipped with Personal Digital Assistant (PDA) inside the cell phone. Mobile application is a new and fast developing Segment of the global Information and Communication Technology. Mobile application is easy, user friendly, inexpensive, downloadable and able to run in most of the mobile smartphones which have android system. Android and iOS are leading operation systems that are available in the market. Mobile applications give users a quick and reliable user experience, Akshay Singh, Sakshi Sharma and Shashwat Singh [2]. Mobile Application is also a familiar software and well known for users as web app, online app, iPhone app or smartphone app; As a platform, Android is developed by using the software stacks with operating system, middleware, and modified Linux kernel, Eueung [6]. Types of Mobile Applications as a medium used to address the goal of this research is that the App is focused on presenting information through windows.

2.3. Android

Android is platform of an open-source operating system for mobile devices that structured from software stack that based on Linux [6]; Android is open source and this encouraged a huge community of enthusiasts and developers to use its code for developing community driven projects with which they can add additional features for advanced users. They can also install android on devices that run on other OS [14]. The interface users of this Android operating system based on the direct data manipulated technique in which is designed for touchscreen device such as smartphones, and some other electronic devices [14].

2.4. Android Studio Development

Android Studio is an official integrated development environment (IDE) and offers more features that enhance developer’ productivity when building Android Apps. To build Android App, the Java Development Kit (JDK) and the Android Development Kit (SDK) are installed and used for platform of mobile development. To run the the Android studio
program normally, the JDK has to be installed in order the Android Studio can function properly on the operating system of Windows and Linux [12]. The JavaScript is used for cross-platform mobile app development. The Java Script is used for the app programming language.

2.5 Mobile Application Design Development
The Mobile Application Design Development starts by designing layering, then code is constructed in each layering to connect it to each menu. The program is tested to see if it runs well or not. If there is no error found in the programming language, then program is compiled to develop for mobile application, then is installed in smart phones for testing. Installation testing was conducted into several different smart phones with different android platforms. If the error was found, the program is fixed until the program is ready to use new features on the users’ android smart phones.

2.6. Indonesian Language for Foreign Speakers (BIPA) Learning Level A1
The BIPA learning outcomes level A1 has basic competencies such as: (1) be able to make a self-introduction and introducing someone to others and making questions and answers in details about personal information; (2) to understand and be able to use language expressions used in daily conversations, making questions and answers, for example asking and responding relayed to addresses, physical appearances, personal belongings, prices, hobbies, daily activities, congratulating, expressing condolences clearly and fluently; (3) be able to interact in a simple conversation in the daily contexts [3]. Learning materials developed inside the mobile application for BIPA learning Level A1 adapted from the book entitled “Sahabatku Indonesia” level A1 which is published by the Badan Pengembangan dan Pembinaan Bahasa, Ministry of Education and Culture Republic Indonesia 2016 [3]. This book has been standardized and used nationally within the nationwide for BIPA teaching and learning materials in Indonesia and overseas.

3. Research Methodology
Research Stages
• Location of the Research
• Parameter Measurements and Observation
• Research Model
• Design Method of Mobile Application
• Interface Program Design
• Android Programming and Application Development
• Application Testing
• Technique of Data Collection
• Analysis and Discussion
Research Stage

START

Initial Data Collection

Interface Program Design

Program Code Design

Program Trial Testing

Any Error?

Fixing Errors

Final Data Collection

Data Analysis

Dissemination Program

END

Figure 1: Flow Chart of the Design and Development of the Mobile Application [7]
**Location of the Research**
This research was conducted at Politeknik Negeri Medan, UNIMED, and UINSU.

**Parameter Measurements and Observation**
- Mobile Application Program Design
- Availability of Mobile Application
- Mobile Application Program Evaluation at various types of Smart Phones with different Android Platform
- Interview and questionnaires Testing

**Research Model**
- Research Model used is Mobile Application Program Development and Design.

**Design Method of Mobile Application**

![Figure 2: Lifecycle of Interface Program Design Application [12]](image)

4. **Interface Program Design**
Interface of Mobile Application Program of the Indonesian Language for Foreign Speakers (BIPA) Level A1 was developed in a simple way with 4 depth menu levels to make users easily move from one menu of skill to the other skills as wished. Each skill menu is presented in the sub-skill menu that deals with the interactive multimedia program such as texts, audio and video that help users accelerate their Indonesian language learning process.

4.1. **Android Programming and Application Development**
The Android SDK was developed using the Java programming language. Android application is developed using android Studio environment by downloading Android...
Studio and installed on Windows which is linked to the platform and operating system. The programming code in the Mobile Application made by Java, because this application does not use many resources in order to make the program running well and make the user easy to use the application [13].

4.2. Application Testing

| PLATFORM ANDROID       | INSTALLATION TIME (second) | FEATURES (%) |
|------------------------|----------------------------|--------------|
| V.4.0 (Ice Cream Sandwich) | 7                          | 100          |
| V.6.0 (Marshmallow)    | 5                          | 100          |
| V.8.0 (Oreo)           | 2                          | 100          |

Table 2: Application Testing in various difference Android System

Installation on the Platforms version 4.0 has the longest time due to lack of specification. The fastest time of installation on the platform version 8.0 due to the high specification. In addition, all features work well on all Platforms. Installation on the Platforms version 4.0 has the longest time due to lack of specification. The fastest time of installation on the platform version 8.0 due to the high specification. In addition, all features work well on all Platforms. The Installation time on each Platform, has no significant difference. It shows that the application does not need many resources from the Smart Phone to run on.

5. Technique of Data Collection and Data Analysis

Initial data was collected from pre-test and interview from seven foreign students who were determined as respondents in order to measure competencies baseline. Technique of data collection was conducted by collecting pre-test score from the respondents and used as the initial data about the respondents’ competencies in writing. Whereas an interview was conducted to collect data of respondents’ competencies in listening and speaking. The interview data was conducted with conversation method related to the research object. The interview consists of a conversation between the foreign student and the researcher which is conducted to assess whether the students were able to use the language well. The tool to collect data is developed through an instructed interview in which each student is asked a predetermined list of questions in a specified order.
6. Analysis and Discussion

Result of Written Test Data

| N0. | Respondent | Pre-test | Post-test |
|-----|------------|----------|-----------|
| 1   | R1         | 70       | 80        |
| 2   | R2         | 70       | 83        |
| 3   | R3         | 55       | 68        |
| 4   | R4         | 70       | 82        |
| 5   | R5         | 0        | 60        |
| 6   | R6         | 0        | 65        |
| 7   | R7         | 0        | 35        |

Table 3: Respondents Data of Pre-Test and Post-Test

| N0. | Respondent | Pre-test | Post-test |
|-----|------------|----------|-----------|
| 1   | R1         | 70       | 80        |
| 2   | R2         | 70       | 83        |
| 3   | R3         | 55       | 68        |
| 4   | R4         | 70       | 82        |
| 5   | R5         | 0        | 60        |
| 6   | R6         | 0        | 65        |
| 7   | R7         | 0        | 35        |

Table 4: Written Test Data Processing

The mean score of pre-test stood at 38% whereas the post test was 56%. Pre-test and post-test scores obtained without differentiating period of time of learning indicated an increase at 30%, but if respondents are classified into two groups of foreign students who have studied for one year in Indonesia (R1-R4) and have never learned Indonesian Language before in Indonesia (R5-R7) showed that there is an increase to group I by 12% and group II with the increase by 56%.

Pre-test and post-test scores can also be seen in the following bar diagram. Series 1 shows that pre-test score from each respondent, and series 2 shows that post-test score from each respondent.
| No. | Respondent | Pre-test | Post-test | Pre-test | Post-test | Different |
|-----|------------|----------|-----------|----------|-----------|-----------|
| 1   | R1         | 70       | 80        | min      | 55        | 68        |
| 2   | R2         | 70       | 83        | max      | 70        | 83        |
| 3   | R3         | 55       | 68        | mean     | 66        | 78        | 12        |
| 4   | R4         | 70       | 82        |          |           |           |
| 5   | R5         | 0        | 60        | min      | 0         | 35        |
| 6   | R6         | 0        | 65        | max      | 0         | 65        |
| 7   | R7         | 0        | 35        | mean     | 0         | 53        | 53        |

Table 5: Respondents Test Scores Clustering

The Interview Result Data

| No. | Respondent | Pre-test (%) | Post-test (%) |
|-----|------------|--------------|---------------|
| 1   | R1         | 75           | 83            |
| 2   | R2         | 78           | 85            |
| 3   | R3         | 65           | 72            |
| 4   | R4         | 75           | 85            |
| 5   | R5         | 15           | 50            |
| 6   | R6         | 15           | 50            |
| 7   | R7         | 10           | 35            |
| min |            | 10           | 35            |
| max |            | 78           | 85            |
| mean|            | 48           | 66            |
| mean difference | | | 18 |

Table 6: Respondents’ Interview Scores
| No. | Respondent | Pre-test (%) | Post-test (%) | Pre-test | Post-test | Difference |
|-----|------------|--------------|---------------|----------|----------|------------|
| 1   | R1         | 75           | 83            | min      | 75       | 72         |
| 2   | R2         | 78           | 85            | max      | 78       | 85         |
| 3   | R3         | 65           | 72            | mean     | 73       | 81.25      | 8          |
| 4   | R4         | 75           | 85            |          |          |            |
| 5   | R5         | 15           | 50            | min      | 10       | 35         |
| 6   | R6         | 15           | 50            | max      | 15       | 50         |
| 7   | R7         | 10           | 35            | mean     | 13       | 45         | 32         |

Table 7: Respondents Interview Scores Clustering

Bar Chart 1: Interview Result
7. Conclusion
The Mobile Application is very effective, and helpful because it gives effective learning due to its flexibility. There is a significant increase on the skill obtained from written test by 30% and 18% on the interview. The most significant increase obtained by the group of foreign students who never learned Indonesian language before by 56% whereas the increase occurred to group of foreign students who already learned Indonesian language by 12%. Furthermore, the increase also obtained in interview by 32% to the group of foreign students who never learned Indonesian language before and the group of foreign students who already learned Indonesian language reached by 8%. This difference shows that the Mobile Application Program is very effective and contributes to the increase of foreign students’ skills who just started learning Indonesian language for Foreign Speakers (BIPA).

7.1. Recommendation
Indonesian language for Foreign Speakers learning method should be integrated into technology utility with computerized basis such as development of system that can make learning process easier due to its flexibility and accelerate the students learning process. To maximize the ready system needed a training for respondents as users of the system in this case the foreign students who use the mobile application program to make their learning more easy and effectively, and efficiently.

References
[1] Ahmad, Irdamis. 2009. Konsul Jenderal RI di Ho Chi Minh City. 12 Juni 2009. Bahasa Indonesia Jadi Bahasa Kedua di Ho Chi Minh City. https://bola.kompas.com Jakarta 12 Juni 2009.

[2] Akshay Singh, Sakshi Sharma and Shashwat Singh. 2016. Android Application Development using Android Studio and PHP Framework, International Journal of Computer Applications (0975 – 8887) Recent Trends in Future Prospective in Engineering & Management Technology 2016.

[3] Badan Pengembangan dan Pembinaan Bahasa, Ministry of Education and Culture Republic Indonesia. 2016. “Sahabatku Indonesia” level A1.

[4] 10 bahasa yang paling banyak digunakan di dunia. http://dewara.com/10-bahasa-yang-paling-banyak-digunakan-di-dunia/

[5] Dhakiri, Muhammad Hanif. 2017. Menaker Sebut Ada 74.000 Tenaga Kerja Asing di Indonesia. Banyuwangi: (http://regional.kompas.com/read/2017/01/29/18384601/menaker-menyebutkan-ada-sekitar-74.000.

[6] Eueung, Mulyana. 2012. App Inventor : Ciptakan Sendiri Aplikasi Androidmu. Yogyakarta: Penerbit Andi.

[7] HM, Jogiyanto., Akt., MBA., Ph.D, Prof. 2008. Metodologi Penelitian. Yogyakarta : Penerbit Andi.
[8] Kementerian Pendidikan dan Kebudayaan Republik Indonesia. 2016. *581 Mahasiswa Asing Ikut Program Darmasiswa di Indonesia*  
https://republika.co.id/berita/pendidikan/dunia-kampus/16/08/31/ocqzko368-581-mahasiswa-asing-ikut-program-darmasiswa-di-indonesia.

[9] Kementerian Pendidikan dan Kebudayaan Republik Indonesia. 2016. Program Prioritas Badan Pengembangan dan Pembinaan Bahasa : 8 BIPA Learning Centers in ASEAN Regional; 13 BIPA Learning Centers in the World.  
https://studylibid.com/doc/472895/160222-program-prioritas-badan-bahasa

[10] Kementerian Pendidikan dan Kebudayaan Republik Indonesia. 2017. *637 Mahasiswa Asing Belajar Budaya Indonesia Melalui Darmasiswa.*  
https://www.kemdikbud.go.id/main/blog/2017/08/637-mahasiswa-asing-belajar-budaya-indonesia-melalui-darmasiswa-2017.

[11] Kementerian Pendidikan dan Kebudayaan Republik Indonesia. 2018. *Kemendikbud Berikan Pembekalan Kepada 679 Peserta Program Darmasiswa Tahun Akademik 2018/2019*  
https://republika.co.id/berita/pendidikan/dunia-kampus/16/08/31/ocqzko368-581-mahasiswa-asing-ikut-program-darmasiswa-di-indonesia

[12] Smyth, Neil. 2015. Android Studio Development Essentials – Android 6th Edition.

[13] Subhan, Mohamad, S. Kom. 2012. Analisa Perancangan Sistem. Jakarta : Lentera Ilmu Cendekia.

[14] Swift, Os. 2015. *Android Programming Guide: Android App Development Learn In A Day!* - 2nd Edition.  
https://www.pdfdrive.com/android-app-development-programming-guide-learn-in-a-day-e186841726.html

[15] UU (Indonesian Constitution) No. 24 Th. 2009 tentang Bendera, Bahasa, dan Lambang Negara dan lagu Kebangsaan pada pasal 44.