

## Conference Paper

# Implementation of an Android-Based Application as a Thematic Interactive Learning Media for English Subjects

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**Abstract**

This study aimed to introduce an Android-based application that provides a thematic interactive learning media for English subjects. This application facilitated 1<sup>st</sup> grade elementary school students to answer questions in a more interactive and fun way as part of their 2013 curriculum. The waterfall method was used to design the application, starting from the requirements, design, implementation and verification. The results of implementing this application were that the students could interact and work directly on the practice questions submitted by the teacher. They also could review the exercise questions anytime and anywhere. The application also stored the test results so these could be seen by parents. Therefore, the application could stimulate the students' creativity and enthusiasm for learning both at school and at home.

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Published: 11 March 2021

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Selection and Peer-review under the responsibility of the AICLL Conference Committee.

**Keywords:** Android-based application and thematic interactive learning media

## 1. Introduction

The era of information and communication technology requires people to have excellent skills in the use of technology and language. Technology and language are two essential things that could not be separated from human life. People always deal with technology and language in their daily lives. Technology and language have the same function that is to bring society to a higher civilization through communication. One of the developments in technology could be seen from the many electronic equipment inventions, such as smartphones. The development of technology is growing faster, and more advanced knowledge of English is required.

In the implementation of the 2013 curriculum, the elementary school teachers are asked to deliver some practice questions. The 2013 curriculum was designed to facilitate the needs of the latest competencies that emphasize communication skills and

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creativity. The curriculum uses a thematic approach as integration of learning materials and activities. This approach begins by determining a theme, which is then developed into a sub-theme by showing its relationship with the related subjects. In this connection, themes could relate to the learning activities, both in certain subjects and across subjects. Those are the essential points in the formulation of other competencies such as attitudes, knowledge, skills, and abilities that uses thematic learning methods. This method asks the teacher to develop or create creative ideas in the learning process. For achieving the goal, several learning methods have been made to increase the level of understanding of the material, such as interactive learning media.

The main problem that exists today is the unavailability of interactive and attractive teaching aids for the first-grade of elementary school students so that the learning process is not optimal. The students only become passive listeners of the material presented. In the form of games, for example, teachers are still using conventional methods that consist of pieces of paper containing letters. It is quite difficult because the teacher must always prepare a variety of materials and teaching aid tools. Also, at home, the students could not repeat the questions that have been discussed by teachers. It becomes a challenge for children to develop the knowledge they have gained at school. They only get material explanations from the school teachers by doing practice. This becomes an obstacle in the teaching and learning process and makes the students unable to learn independently. Therefore, through technology that is currently developing, a learning application could be designed as an alternative way to present interactive practice questions, especially in the field of Mobile, namely Android.

This study aimed to introduce an Android-based application that provides a thematic interactive learning media for English subjects. This application facilitated the 1<sup>st</sup> grade of elementary school students to answer questions more interactive and fun, referring to the 2013 curriculum. The students could learn and work directly on the practice questions delivered by the teacher through the application. They also could practice again for completing the questions at home anytime and anywhere. The application would also save the student learning outcomes with grades that could be seen by parents. Hopefully, the students' creativity would be more stimulated and spurred for learning both at school and home. Also, parents could monitor their children's learning development.

## 2. Literature Review

As mobile devices, smartphones are supported by internet services and almost inseparable from the lives of advanced people in carrying out their daily activities. Smartphones and other mobile devices are no longer foreign to today's society, where most people have them. Mobile technologies and applications are becoming an essential part of learning, including foreign language learning. Through today's smartphone era, where everything is mobile, the concept of CALL (Computer Assisted Language Learning) has been developed into the MALL (Mobile Assisted Language Learning). This is in line with what is stated by Gangaiamaran and Pasupathi (2017) that MALL has several characteristics that CALL does not have, including portability and mobility, social connectivity, and context-sensitivity, and individuality.

English would be easier to be taught to children from an early age. Krisnawan (2015) argued that the English language learning ability using the game method is among the most popular innovations among early childhood, where children at an early age are still pleased to play. As a result of mobile technology development, many English language learning applications could be used in learning activities. Android's use in smartphones could support English language learners in the achievement of learning English skills mastered (Lutfiansyah, 2016). It could also develop the English language learners' ability to fit up to the segmentation of the students' level that they like to accomplish. Yuliawati (2018) stated that most of the students have ever downloaded and used Android-based English Language Learning applications, and they feel it is beneficial in improving their English skills. In similar, Wijayanto and Hernawati (2019) explained that MALL could become one of the alternative English learning models to prepare the students for practicing the simulations of the examination.

Gangaiamaran and Pasupathi (2017) and Klimova (2019) agreed that mobile learning's key features are personalized learning and independent on time and place. Those are the collaboration with students and teachers in both formal and informal settings. Wijayanto (2018) stated that some challenges to preparing the English course materials are to investigate, categorize, select, construct, modify, and develop the materials that apply to the learners' needs. The interactivity of mobile devices makes mobile learning more efficient. MALL could provide easy access for any learner without the constraints of both place and time. In mobile learning, devices like smartphones, iPods, tablets, laptops, iPads are implemented to support language learning. Even though mobile learning seems to like to be effective overall, it is necessary to design, plan and

implement it with carefulness, according to students' needs, and to deliver multiple language skills in authentic learning environments (Kacetl and Klímová, 2019).

### 3. Research Method

The method used in designing this application is the waterfall. The waterfall method is an orderly and sequential method of software development, sorted from top to bottom (Susanto and Andriana, 2016). This model includes several stages of the process, as shown in Figure 1.

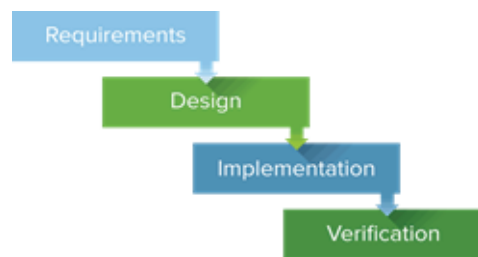


Figure 1: The Waterfall Model

The first stage was the requirements. The researchers conducted observations in the first grade of elementary school students and teachers. The purpose of this stage was to identify the kind of application that needs prospective users related to the learners' needs. The next stage was the design. Based on the specifications of the requirements that have been determined before, a system design would be prepared that would assist in determining the hardware and system requirements. Also, it helped in defining the overall system architecture. The system design is in the form of application views to be built (integration and system testing). Then, in the implementation stage, the system was developed in small programs called units integrated into the next step. Each unit is developed and tested for functionality known as unit testing. Finally, in the verification stage, all units developed in the implementation are integrated into the system. After integration, the entire system is tested to check for any failures or errors.

### 4. Result and Discussion

The solution offered in this study was by making additional teaching aids that could be used by teachers and students. The teaching aid offered is an Android-based application. This application is expected to help in the learning process by making interesting and interactive applications for the first graders of elementary school for English subject. The subject is incorporated in Thematic Book 1 entitled "All About Me."

The guidebook that becomes the reference is a manual for teachers and a guide for students.

In the application, students are provided with several menus that could be used when delivering material and during the learning process. The use of this application is also aimed at first graders of elementary so that they could repeat the English materials presented by the teacher independently so that it could support the teaching and learning process.

In this book, there are four different sub-themes, namely “Me and New Friends,” “My Body,” “I Care for My Body,” and “I’m Special.” The topic of this final project is the first sub-theme entitled “Me and New Friends.” In this sub-theme, there are six learning activities, including:

TABLE 1: Sub-Themes and Thematic Learning Activities 1

Sub-theme	Learning Activities
Lesson 1	<ul style="list-style-type: none"> <li>• New friends</li> <li>• Recognizing the voice of new friends</li> </ul>
Lesson 2	<ul style="list-style-type: none"> <li>• Moving with friends</li> <li>• Playing with friends</li> </ul>
Lesson 3	<ul style="list-style-type: none"> <li>• Recognizing letters with friends</li> <li>• Recognizing numbers and counting with friends</li> </ul>
Lesson 4	<ul style="list-style-type: none"> <li>• Playing simple games with friends</li> <li>• Recognizes the color of a friend's voice</li> </ul>
Lesson 5	<ul style="list-style-type: none"> <li>• Know the letters that makeup names with friends</li> <li>• Getting to know number symbols with friends</li> </ul>
Lesson 6	<ul style="list-style-type: none"> <li>• Playing about letters with friends</li> <li>• Getting to know the environment while reading numbers</li> </ul>

### 4.1. System Requirements Analysis

This application was built to be a learning medium in the delivery of material. The following are some of the functionality of this application.

### 4.2. Hardware and Software Requirements

Following are the hardware and software requirements used in system development.

Below are the hardware and software specifications on smartphones used in system development.

The software used in the development of Android-based learning media is as follows.

The system implementation that the user needs to run the application is as follows.

TABLE 2: Application functionality

No	Functionality	Description
1	Displaying materials according to the student manual book	The materials are related to the student manual book
2	Giving instructions to students to practice following the moving pictures /animation materials	Instructions are clarified again by the teacher if needed
3	Producing sounds to clarify the delivery and explanation of the material	Sounds are displayed in the form of verbal instructions to make it easier for children to understand the materials
4	Displaying the charter according to the student's achievement	Charter is a form of achievement to trigger the students' enthusiasm

TABLE 3: Computer Hardware Specifications

Computer Hardware	
Processor	AMD A6-4400M APU @2.70 GHz
RAM	6Gb RAM
Harddisk	500Gb

TABLE 4: Hardware and Software Smartphone Specifications

Hardware and Software Smartphone	
Processor	Hexa-core Max @1.8Ghz
RAM	2Gb RAM
Sistem Operasi	Android Nougat

TABLE 5: Computer Software Specifications

Software	
Operating system	Windows 10 64-Bit
The main program of application development	Android Studio
Graphic Editor	Adobe Photoshop CS6
Audio Editor	Audacity 2.1.1
Diagram Editor	yEd 3.16.2.1

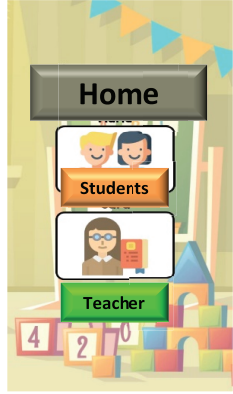
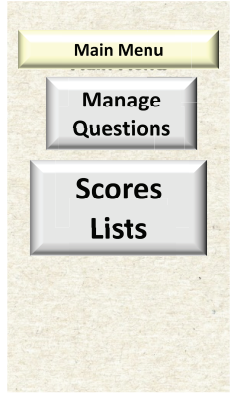
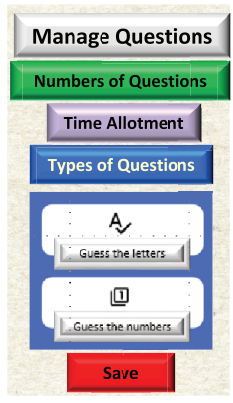
TABLE 6: Minimum Hardware and Software Specifications in System Implementation

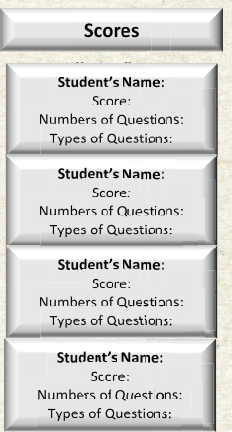
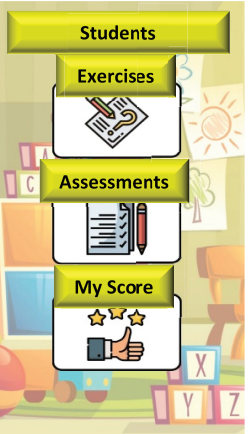

Hardware dan Software Smartphone	
Processor	Quad-core @1.8Ghz
RAM	2Gb RAM
Operating system	Android Lollipop

### 4.3. Storyboard, Application Mockup, and Testing

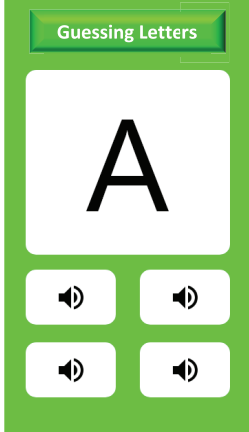
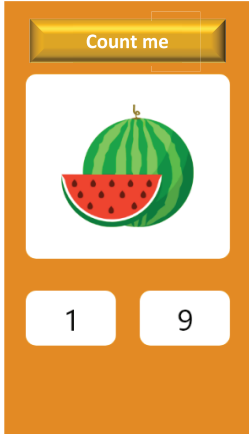
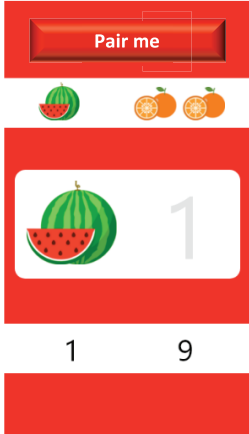
Here is a storyboard and mockup application to visualize the sequence of applications built.

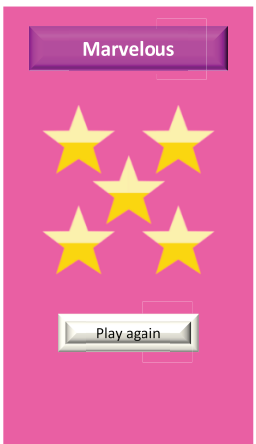
TABLE 7: Storyboard, Application Mockup, and Testing

No	Frame	Content	Information
1		<ul style="list-style-type: none"> <li>a. Student button to select the menu for the student</li> <li>b. Teacher button to select teacher menu.</li> </ul>	<p>This frame is the first display of the application. In this view, the user could choose to access the application as a student or teacher.</p>
2		<ul style="list-style-type: none"> <li>a. Set a question button to select the question set menu.</li> <li>b. The score button for selecting the score menu.</li> </ul>	<p>This frame is the second display of the application after selecting the teacher menu to access features as a teacher in the application.</p>
3		<ul style="list-style-type: none"> <li>a. Numbers of questions button to set the number of questions.</li> <li>b. Time allotment button to set the time for answering the questions.</li> <li>a. Types of questions to select the types of questions you want.</li> </ul>	<p>This frame is the third display of the application after selecting the question set menu to set the number of questions to be tested.</p>

No	Frame	Content	Information
4		<p>The list of scores of students who have taken the test</p>	<p>This frame is the fourth display of the application after selecting the grades menu to see the scores of students who took the test.</p>
5		<ol style="list-style-type: none"> <li>a. Exercises button to choose to do the exercises.</li> <li>b. Assessments button to choose to do the tests</li> </ol>	<p>This frame is the second display of the application after selecting the student menu to choose what type of question you want to work on.</p>
6		<ol style="list-style-type: none"> <li>a. The guessing letters button -&gt; to choose a question with a letter theme.</li> <li>b. The guessing number button -&gt; to select number theme questions.</li> </ol>	<p>This frame is the first display of the application. In this view, students could choose between questions with a letter theme or a number theme.</p>



No	Frame	Content	Information
7		<p>a. The button for answering the question.</p> <p>b. The next button that would appear when the student chooses at least one answer first.</p>	<p>The second frame contains multiple-choice questions. In this problem, audio media is used to show the pronunciation of the existing questions. The audio is in multiple options.</p>
8		<p>a. The button for answering the question.</p> <p>b. The next button that would appear when the student chooses at least one answer first.</p>	<p>The third frame contains true or false questions. This problem is similar to the previous one, but it only uses two multiple choices, and no audio is used. The student would be focused on the question image displayed.</p>
9		<p>a. Drag and drop the module for questions and answers.</p> <p>b. The next button that would appear when the child chooses at least one answer first.</p>	<p>The fourth frame contains a drag and drops questions. In this question, it would pull up pictures and answers from the space provided.</p>

No	Frame	Content	Information
10		The button "Play Again" serves to return to the start page of the application.	This iframe contains the result of the child's answer. The more stars the child gets, the more correct answers the student gets. The maximum is five stars, and the minimum is zero stars.

#### 4.4. Implementation

Below is a list of the minimum implementations of the application.

TABLE 8: The Minimum Implementations of the Application

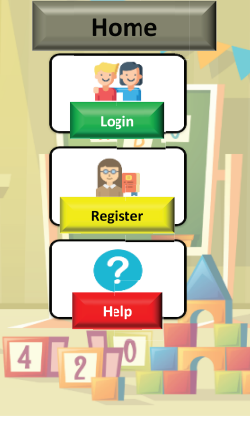
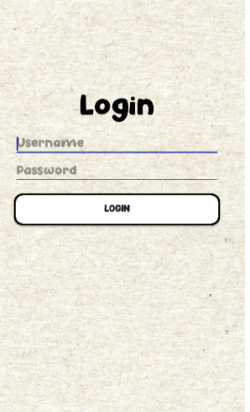
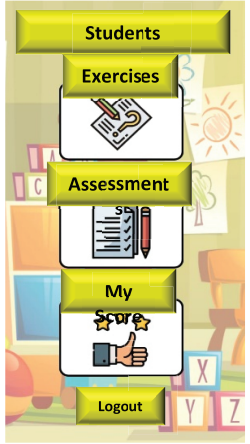
Performance Requirements	Minimum Specifications
Implementation on Android	OS: Android Jelly Bean Processor: Quad-core @1.00 GHz RAM: 2 Gb
User Capabilities	Basic reading and writing
Number of Users	> 1
User Description	Minimum the six years old students
Internet connection	No

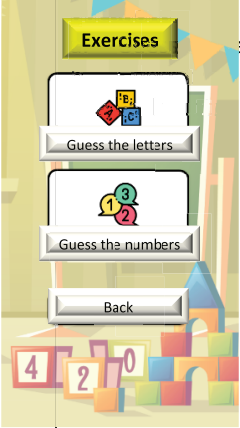
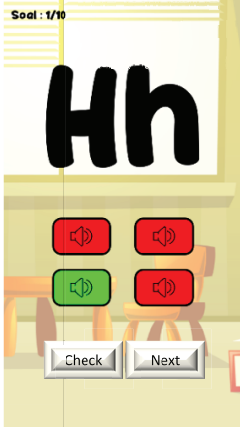
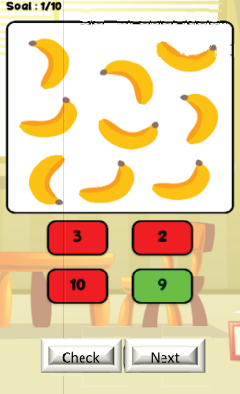
For the installation process, the user just downloads the application or installs it by the developer in the user software manually. The application does not require any advanced configuration to perform the main functionality. Applications simply run offline without the need for an Internet connection.


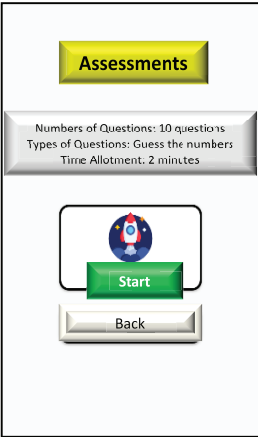

#### 4.5. Application User Interface Implementation



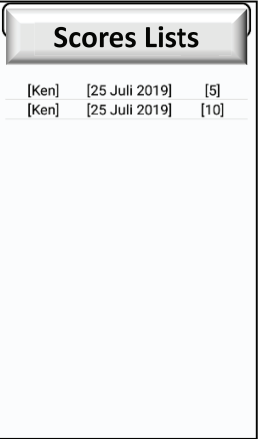
The following is the result of implementing the User Interface in the application being built.

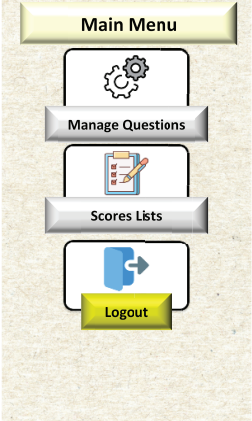
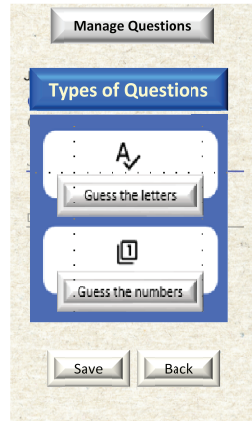
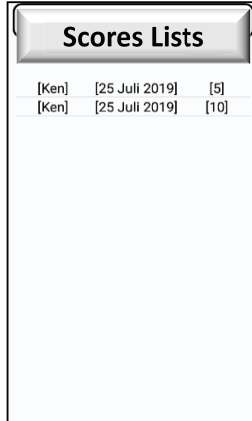
TABLE 9: Implementation of the Application User Interface

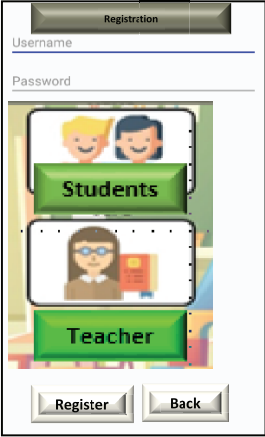
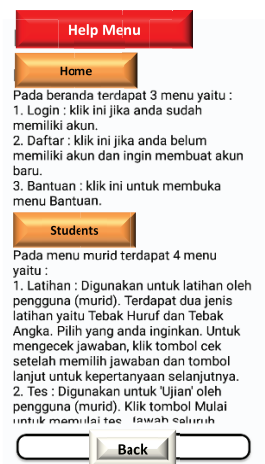
No	Page	Information
1		<p>Here is the main page of the application, where two buttons would direct the user who runs the application as a student or as a teacher.</p>
2		<p>Both users would enter a username and password to be able to run the features in the application.</p>
3		<p>When the user chooses to enter as a student, a display would appear as follows. There are three menu options for students to choose from.</p> <ol style="list-style-type: none"> <li>Exercise - By selecting the exercise menu, students could work on practice questions.</li> <li>Tests - By selecting the test menu, students could do test questions</li> <li>My grades - By selecting the My grades menu, students could find out the score they received while taking the test.</li> </ol> <p>The button "logout" functions so that students could exit the application.</p>

No	Page	Information
4		<p>When selecting the practice menu, students could choose one of two types of practice</p> <p>Letters - Students would do letters guessing questions.</p> <p>Numbers - Students would do numbers guessing questions.</p> <p>functions to return to the previous page, namely "Home Students."</p> 
5		<p>The following is a display on the menu of guessing letters, where the alphabet would be there are four sound choices below, students must match which sound letters displayed.</p> 
6		<p>The following is a display on the number guessing question menu, where a picture would and there are four number choices under it. Students must count the figures displayed and choose the right number.</p> 

No	Page	Information
7		<p>The following is a display of the scores obtained after the student has completed all the practice questions.</p>
8		<p>When selecting the test menu, students could select the start button to work on test questions.</p>
9		<p>The following is a display on the menu of guessing numbers on the test, where a picture would be presented, and there are four number choices under it. Students must count the number of pictures displayed and choose the right number. What is different in the test is that there is time running to calculate the time for solving the questions.</p>

No	Page	Information									
10		<p>The following is a display of the scores obtained after the student has completed all test questions.</p>									
11		<p>The following is a display of the scores obtained after the student has completed all test questions.</p>									
12	 <table border="1" data-bbox="464 1267 724 1704"> <thead> <tr> <th colspan="3">Scores Lists</th> </tr> </thead> <tbody> <tr> <td>[Ken]</td> <td>[25 Juli 2019]</td> <td>[5]</td> </tr> <tr> <td>[Ken]</td> <td>[25 Juli 2019]</td> <td>[10]</td> </tr> </tbody> </table>	Scores Lists			[Ken]	[25 Juli 2019]	[5]	[Ken]	[25 Juli 2019]	[10]	<p>The following is a display of the overall score, which is the result of the student's test questions.</p>
Scores Lists											
[Ken]	[25 Juli 2019]	[5]									
[Ken]	[25 Juli 2019]	[10]									

No	Page	Information									
13		<p>When the user chooses to enter as a teacher, a display would appear as follows. There are two menu options for the teacher to choose from.</p> <ol style="list-style-type: none"> <li>Arrange the questions - By selecting the question set menu, the teacher could adjust the number of questions and the time for the test.</li> <li>See the value - By selecting the view grades menu, the teacher could see a list of students with their test scores.</li> </ol> <p>The button "logout" functions so that students could exit the application.</p>									
14		<p>The following is the question management menu, where the teacher could choose the type of question, set the processing time and the number of questions to be tested.</p>									
15	 <table border="1" data-bbox="451 1254 703 1673"> <thead> <tr> <th colspan="3">Scores Lists</th> </tr> </thead> <tbody> <tr> <td>[Ken]</td> <td>[25 Juli 2019]</td> <td>[5]</td> </tr> <tr> <td>[Ken]</td> <td>[25 Juli 2019]</td> <td>[10]</td> </tr> </tbody> </table>	Scores Lists			[Ken]	[25 Juli 2019]	[5]	[Ken]	[25 Juli 2019]	[10]	<p>The following is a value view menu where the teacher could see a list of students who took the test questions and the scores they obtained.</p>
Scores Lists											
[Ken]	[25 Juli 2019]	[5]									
[Ken]	[25 Juli 2019]	[10]									

No	Page	Information
16		<p>The following is a registration menu where users who would use the application would register a username and password.</p>
17		<p>The following is a help menu that would explain the instructions for use in the application.</p>

## 5. Conclusion

The study aimed to introduce an Android-based application that provides a thematic interactive learning media. The application facilitated the English subjects for the 1<sup>st</sup> grade of elementary school students to answer questions more interactive and fun, referring to the 2013 curriculum. The implementation results of this application is that the students could learn and work directly on the practice questions delivered by the teacher through the application. They also could practice again for completing and reviewing the exercise questions anytime and anywhere. The application also stored the score test results that could be seen by parents. Therefore, the application could stimulate the students' creativity and enthusiasm for learning both at school and at home. The application would also save the student learning outcomes with grades that could be seen by parents.



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