



**ASHESI**

**ASHESI UNIVERSITY COLLEGE**

**USING TECHNOLOGY TO IMPROVE ADULT LITERACY IN**

**GHANA**

**APPLIED PROJECT**

B.Sc. Management Information Systems

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**ASHESI UNIVERSITY COLLEGE**

**Using Technology to Improve Adult Literacy in Ghana**

**APPLIED PROJECT**

Applied Project submitted to the Department of Computer Science, Ashesi University College in partial fulfilment of the requirements for the award of Bachelor of Science degree in Management Information Systems

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**April 2018**

## DECLARATION

I hereby declare that this Applied Project is the result of my own original work and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature:

.....

Candidate's Name:

.....

Date:

.....

I hereby declare that preparation and presentation of this Applied Project were supervised in accordance with the guidelines on supervision of Applied Project laid down by Ashesi University College.

Supervisor's Signature:

.....

Supervisor's Name:

.....

Date: .....

## **Acknowledgment**

I would like to say thank you to my supervisor, Dr Ayorkor Korsah for her support, devotedness and guidance through the course of this project. I would like to thank my family and friends especially my parents for their help and encouragement as I undertook this project . I would like to thank Dr. Berdie and Mr. Tim for their endless help.

## **ABSTRACT**

According to the Ghana Living Standards Survey (GLSS6) conducted between October 2012 and October 2013, 69.6% of adults in the country are literate. Initially, being literate meant to be able to read and write, but today it is not only about reading and writing but being able to fully utilize these skills to solve problems. Literacy should focus on how the learner can apply whatever they learn in their daily life activities. The busy schedule of Adesua Ye students does not allow them to come for adult literacy classes. From interviewing Adesua Ye students and random adults, all they needed from the adult literacy program is the ability to help their children with their assignments and interact with their clients. This paper seeks to explore how technology can be used to improve Adult literacy. This way, they would not have to come to class every single day of the week. However, classes would not be cut off completely because of the high rate of e-learning drop-out.

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## **Chapter 1:Introduction**

### **1.1 Introduction**

The United Nations Educational, Scientific and Cultural Organization (UNESCO), defined literacy as “the status of being well educated or learned” (Hoffman-Goetz, Donelle and Ahmed, 2014). However, the Center for Literacy gives a more detailed definition. It says, “Literacy involves a complex set of abilities to understand and use the dominant symbol systems of a culture for personal and community development at home and at work” (The Center for Literacy, 2014). Initially, being literate meant to be able to read and write, but today it is not only about reading and writing but being able to fully utilize these skills to solve problems. Literacy should focus on how the learner can apply whatever they learn in their daily life activities.

English is the official language of Ghana, so it is necessary that adults are proficient in English. This is because the adults contribute to the decision making process in Ghana. It is necessary for them to know the language because this is how the government communicates with the citizens of the country. Also, they would have to know the language to get involved in their children’s education.

According to the Ghana Living Standards Survey (GLSS6) conducted between October 2012 and October 2013, 69.6% of adults in the country are literate . However, 56.3% of these adults in the rural areas are literate. Literacy in this survey was defined as the ability to read and write simple English. (Ghana Statistical Service, 2014). It is evident that more work needs to be done in rural areas in relation to adult literacy as compared to the urban areas. This paper explores ways in which technology can be employed to make adult education more effective.

## 1.2 Background

The target audience for the work in this paper is the people of Berekuso. Berekuso is a town located in the Eastern Region of Ghana. According to the 2010 census made by Ghana Statistical service (GSS), the population of Berekuso is 1,759 with people aged 15 and above forming 1,114 of the total population. A sample of people were taken from this town. This Applied Project was done in conjunction with Adesua Ye. Adesua Ye was an Adult literacy program in Berekuso on the Ashesi University Campus. Ashesi University is located on a hill in Berekuso. The aim of Adesua ye was to equip the adults with enough English and Math skills for their daily interactions. Adesua Ye officially started in October 2012. Classes were organized on Ashesi University College campus from Monday to Thursday from 7pm to 9pm. Over the past 3 years, the numbers have reduced and now no one comes at all. The students complained that it was stressful to climb the hill every day, because they were already tired from working all day. There is lack of concentration amongst the students because they are tired. Some complained about the long distance from their homes to the literacy program venue.

Throughout my research, I realized that more people are working on how to employ technology in Adult literacy but there is still a gap. Thus, this research will be a buildup on the work other people are doing in relation to technology in Adult literacy.

Most of the adult literacy programs organize classes that the adults have to attend after work. The time of the classes causes an inconsistency in the attendance of the students. Also, most of these programs are implemented in classes and some adults might need special attention. As a result, the classes would not be moving at their pace. However, if an application is created, they can have the lessons on their tablet and use it whenever they are free. They would not have to come for classes every day and this would also enable them to learn at their own pace.

An application on a tablet that would be loaned to the adult literacy students would mitigate majority of these issues.

### 1.3 Related Work

According to a report made by United Nations Educational, Scientific and Cultural Organization(UNESCO), *Literacy and non-formal education* (UNESCO,2017) , everyone has the right to literacy and it is the means through which other rights would be achieved. Little study goes into adult literacy and even when this research is done, they focus more on women. One of the benefits of literacy is that it boosts one's self esteem, empowers people especially women to take action. Literacy programs record higher participation when it comes to politics and union activities. Literacy causes people to take action. The more children knew about democratic institutions when younger, the higher chances were that they would vote as adults. Literacy programs have a subtle way of changing attitudes and behavioral patterns. Literacy programs that make use of minority languages have the potential to improve people's ability to participate in their own culture. Literacy positively affects health. Students make better health decisions. Literacy also promotes economic growth.

As far back as in the 90s, the importance of adult literacy was recognized. The text *Adult literacy in rural areas* ( Ferrell & Hawley, 1991), talks about how in the U.S more policy makers are recognizing the effect adult literacy has on economic development. Adult literacy programs are targeted at the citizens who are more impoverished or those with the most visible need. Upon research, it has been found that these people with high illiteracy rate are found in the rural areas. However, adult literacy programs are difficult to run in these areas. The text explores the goals of adult literacy. The goals of adult literacy are to promote economic productivity, underwrite political change, and affect social equity or to enhance quality of life. The literary needs of people cannot be generalized but their

needs would vary based on communities. However, there are some characteristics that would run through the different communities. For instance rural areas do not value formal education due to this, they spend less times in school as compared to urban areas. They also have access to fewer community services. The people in rural areas want to learn things that would be of relevance to them. They also want to participate in the planning of their adult literacy program. Adult literacy programs tried to adopt functional literacy, which is the minimal skill necessary to receive a high school degree or its equivalent. This is not effective because it focuses on reading skills and leaves out their meaningful context. Community-oriented programs address their needs better. Post literacy is employed to enable the students put into practice their lessons. Post literacy can be defined as a refresher course for adults who have gone through an adult literacy program already. This is to enable them constantly remember what they are taught.

*Andragogy: An Emerging Technology for Adult* (Knowles, M. 1996) looks at the aspects of teaching adults that most people ignore. It shows the difference between teaching children and adults. Andragogy is divided into five concepts, these are: A maturing concept, experience, an increasing readiness to learn, motivation to learn, and orientation to learning. A maturing concept means as a person matures, their self-concept gradually switches from a dependent personality to being a self-directed person. Maturity comes with an accumulation of experiences and these experiences serve as a learning resource for adults. A maturing person is always ready to learn so far as the learning helps him develop skills to handle his social roles. Adults are excited to learn things they would be able to apply immediately and their orientation is not subject centered but rather they focus on problem solving. Finally, they have intrinsic motivation. Due to all of these, adults have to be involved in every decision making process towards the adult literacy program. Knowles advocates that all these concepts have to be inculcated in the teaching

of an adult for it to be effective. In the design of the application, the five characteristics would be considered.

Hari Prastyo (Prastyo, 2015) looks at combining the two approaches the Grammar Translation Method(GTM) and Communicative Language Teaching Method in the teaching of adults. The Grammar Translation Method focuses on knowing the grammatical rules and the implementation of these rules and translating them into other languages as well. This kind of method is assumed to be boring for the students because the teacher would have to stand before the class and bombard the student with the knowledge. For students who do not know any form English, they would end up knowing the rules but not necessarily how to use them. It does not focus on speaking the language that is why a different approach known as the Communicative Language Teaching(CLT) approach is employed.

Communicative Language Teaching Approach focuses on the use of language to improve effective communication. The good thing about CLT is that it gives room for the student to use the language in communication so the probability of boredom is low. This enables the teacher to successfully create a learning environment because they would be employing the language in conversations; this practice is necessary for improvement in the language. The problem with this approach is that, it is hard to make the students open up and start speaking the language without being afraid to make mistakes. Trust has to be built between student and teacher. These two approaches would be employed in the creation of the application to make the students acquire both skills. For starters, the CLT would be used and eventually GTM would be added.

#### **1.4 The Adesua Ye Literacy Program**

The Adesua Ye literacy program is an adult literacy program started in 2012 by Ashesi University students for the adult illiterates in Berekusu. The facilitators are student volunteers in Ashesi University and classes used to run from 7pm to 9pm in the evening from Monday to Thursday on Ashesi University campus.

We teach students basic math and English skills . In addition, we teach them practical things they need to know like how to fill bank forms , interpret the report cards of their children and many more.

Great improvement has been seen in our students. They come from having no knowledge in writing English to being able to write their name, read books and write about themselves.

### 1.5 **Problem Statement**

In the last two years, the students have been inconsistent when it comes to attending class. Interviewing them revealed they were having a problem with climbing the hill of Ashesi University every day. These students are working people ; they come up the hill after work which explains why climbing the hill would be stressful. This means they come to study already tired and they cannot learn much so they might as well stop. Eventually, they start forgetting what they learn because there is inconsistency with their studies.

### 1.6 **Proposed System and Its Benefit**

The Adesua Ye application is an Android application that enables the students learn English conveniently and effectively. The students would learn conveniently because they can learn English with this application whenever they want to and wherever they want to . This would be more effective because they get the opportunity to learn at their own pace. The probability of the students grasping what they learn is high.

However, the classes are not going be cut out completely. The students would be coming for classes once in a week. This would enable tutors to fully evaluate the progress of the

student. Also the rate of e-learning dropout is high (Gortan & Jereb, 2015), so this is to ensure that students are making progress . Elements of the course that are not addressed by the application are taught in person.

### **1.7 Objectives of the project**

The aim of this project is to make learning English as convenient as possible for the students.

The Objective of this project is:

- To make learning of English more interesting so that the students would be motivated to learn it even on their own

### **1.8 Outline of the Report**

This report consists of 6 chapters. The first chapter gives background, the related work, motivation and benefits of this project. The second chapter focuses on the requirements of the application. The third chapter entails the system architecture and design of the application. Implementation of the application is covered in chapter 4 and chapter 5 focuses on the testing of the application. Chapter 6 has the conclusion and recommendations.

## **Chapter 2:Requirements**

This chapter gives the full details of the Adesua ye literacy application, the features of the Adesua Ye application and the functional and non-functional requirements. The intended users and how these requirements came about will be touched on in this chapter.

### **2.1 Requirements Gathering**

The information needed in order to know the requirements were obtained from interviewing Adesua ye students and random adults in the Berekusu village .

#### 2.1.1 Interviews

The interviews were conducted to get information about how people in Berekusu perceived adult education and to find out how proficient they were with mobile phones. The interviews gave me insights into what I needed to address to make technology an effective tool to help adults to improve upon their literacy skills.

Twenty adults between the ages of 25 and 50 in Berekusu were interviewed. Ten of these people were students of Adesua whilst the rest were randomly selected from the Berekusu township. I randomly picked the remaining adults from the roadside and interviewed them. These adults had their educational level being primary but a few ended at JHS. The interviewees were asked what activities they performed on their phones. Some of these people could do everything from making phone calls to surfing the internet and most of these people were men. However 85% of the people I interviewed were using phones that were not smart . The best they could do was to make phone calls and send text messages. 60% of the people did nothing on their phones other than making calls. All of them used their phones very often.

They were also asked what their expectations for an adult literacy program would be and all of them said they wanted to read and write fluently .This would enable them to be able to hold a conversation and follow their children's progress academically.

### **2.1.2 The Adult Literacy Curriculum**

I created the Adult Literacy Curriculum in conjunction with the Ghana Literacy House.

This is the wing of the Ghana Education Service in charge of Adult Education. The syllabus of the National Literacy was under review so they could not give me one. We came up with one for the application. The curriculum is divided into two parts; Primer 1 for beginners and Primer 2 for the intermediate students. The Primer 1 focuses on the fluency of the students' language. It focuses on the different letters of the alphabet, their sounds and how to form words with the letters. It also introduces the concept of nouns and the Primer 2 focuses on the other parts of speech, phrases and sentence construction.

Before the students are assigned to any of the levels, they are tested on concepts in the two primers. The test determines which course they would take. The tutor assists the students to choose their level of study based on the tests they take.

Students that score below 50% would be assigned to the beginner's class. However, above 50% would be assigned to the intermediate class.

### **2.2 Scope of the Project**

The Adesua Ye application is an Android mobile application. The content of the adult literacy application is the curriculum I came up with the National Literacy House. This is because, their current curriculum was under revision ; they did not have a well-structured, up to date curriculum for me. This curriculum has been uploaded onto the application so they can access it offline at any time. It has sounds of the letters of the alphabet, instructions and other elements of the application. It also shows animations of how the individual letters of the alphabet are written and how the letters of the alphabet come together to form words. It also shows images of objects relating to a particular lesson.

### **2.3 User Description**

The main users of this application are the Adesua Ye students. The application would help them grasp the basic concepts in English. What they learn from this application, should enable them to interact with people on a daily basis.

## **2.4 User Requirements**

The adult literacy application will provide daily lessons in English. The application is made up of the student view, the students will be able to study these lessons from the comfort of their homes.

## **2.5 System Requirements**

System requirements gives an in-depth understanding of the functions of the application. They give a clear understanding of what is supposed to be implemented, and they are categorized into functional and non-functional requirements.

### 2.5.1 Functional Requirements

The students who will be interacting with this application will have to be able to successfully go through the following activities.

#### I. Sign Up

The tutor will assist the student fill in the details of the sign up form. Immediately they sign up, they will be directed to the Choices Page. Here, they will look through the list of names and choose their name. Clicking on their name will give them access to the Levels of study page. This is the page where the user is assisted to enroll in the beginner's class or the intermediate class.

#### II. Choosing the level of study

#### III. Choose the lesson for the day

Here, the student chooses the lesson for the day and finishes tasks assigned for the day.

#### IV. The user should be able to listen to the audio and watch animations of words and the letters of the alphabet.

In the course of the study, the students will have to listen to the pronunciation of letters of the alphabet and words. The students will then repeat after the application so that they would get the right pronunciation.

## 2.6 Use case for the users

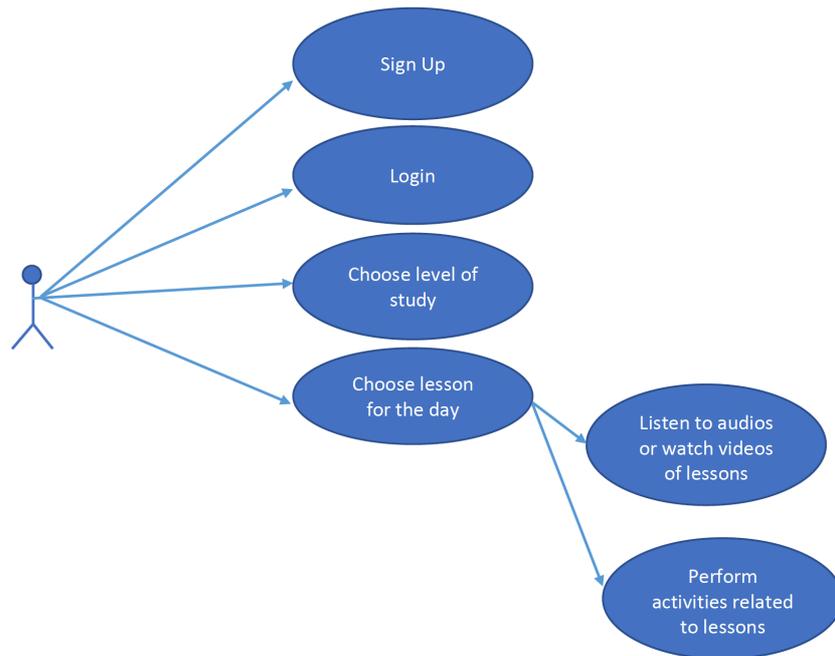


Figure 2.1: Use Case Diagram for users

### 2.6.1 Scenario for student

Adjoa just signed up for the Adesua ye program and has been assigned a tutor. The tutor tests her to get a clear understanding of her level of literacy. He /she then helps her login permanently on her phone and she can start the lessons for her level of literacy. The tutor will put her on the beginner plan or the intermediate plan.

When Adjoa gets home all she needs to do is to open the application and the application directs her to where she left off with the tutor. She can watch animations or listen to audio pertaining to the topic she is treating .After each lesson, she will have to perform an activity

in relation to the topic she just covered. To move to the next page, all she needs to do is click on the next button.

The main functionality of the application is elaborated below:

#### 2.6.2 Sign Up

##### a) Description

This is the process that takes record of the user details and will enable them to login.

##### b) Prerequisite

The user must be new and should have never signed up before.

##### c) Flow

1. The user taps on the icon of the application. A splash screen appears after which he has the option to choose between signing up and signing in.
2. Since the user is new, he chooses the Sign Up button and the sign up page appears.
3. The user enters his name, phone number, location, chooses his educational level and then clicks on the Sign Up button for his input to be validated.
  - If the name textbox is empty or there are less than 5 characters, the user will be notified that there is an error with the input. The input in this textbox is supposed to be the full name of the user so the characters cannot be less than 5.
  - If the phone number textbox is empty or there are less than 10 digits, the user will be notified that there is an error with the input.
  - If the location tab is empty or the characters are less than 2, the user would be notified that there is an error with the input.
  - If the user does not choose any of the education levels they will be notified that there is an error with their input.

- If all the elements have been validated, the user can go to the next page

d) Results

This process stores all the user information in the database so that it can be retrieved at any time.

### 2.6.3 Login

a) Description

This enables the user to gain full access to the application and its functionality.

b) Prerequisite

The user should have already signed up and thus their details should be stored in the database.

c) Flow

1. A list of names of people who have signed up, is displayed on this page from the database.
2. The user has to look through the names and choose their corresponding name.
  - If the user does not find their name in the list, they would have to sign up.

d) Results

This process obtains names from the database and displays it. The user now has full access to the lessons and full functionality of the application.

### 2.6.4 Choose the level of study

a) Description

This is where the user chooses the level of study based on the test they take.

b) Prerequisite

The user should have already logged into the application.

c) Flow

1. The user chooses between Beginners and Intermediate.
2. The option they choose directs them to a page of animated representations of each lesson.
3. The user can click on the first or click on the next button. The user cannot access any of the other lessons unless they have completed the previous lesson. The other lessons are locked and can only be unlocked by the completion of the previous lesson.
4. The user clicks on the lesson, and accesses the content. When they are done, they click the next button.
5. The user clicks play to obtain the audio pertaining to each lesson.

d) Results

The choice of level shows the study path the student is taking. The user can take lessons whenever they want to. Whichever lesson the user chooses, the content of the lesson is taken from the database and displayed.

## **2.7 Non-Functional Requirements**

### 2.7.1 Performance Requirements

The application must be very easy to interact with. It must be very simple. Also it must have a quick response time. The audio must also be very clear and slow enough for the students to be able to understand.

#### 2.7.2 Compatibility Requirements

The application should be compatible with any Android device .

#### 2.7.3 Availability

The application must always be available so that the student can learn at their own time.

This is because we want students to learn at anytime and anywhere.

#### 2.7.4 Interface Requirements

The interface of the application should be very user –friendly so that students would be interested in taking the daily courses. The interface should be easy to understand and the students should be able to navigate through the application easily.

## CHAPTER 3: ARCHITECTURE AND DESIGN

### 3.1 System Architecture

The architecture employed is a multi-layered architecture; in this architecture, the layers are physically separated. This makes them easy to maintain and these layers can be easily reused. This form of architecture is very flexible. The multi-layered architecture consists of three layers and these are: the presentation layer, the application layer and the data layer. This architecture is displayed in the figure below.

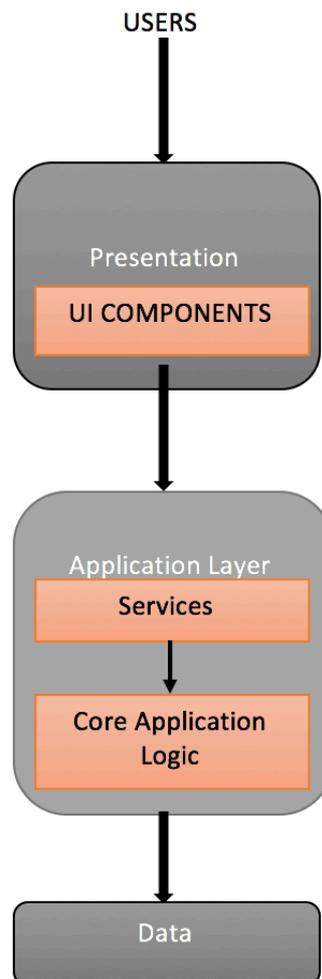


Figure 3.1: Architecture of the application

### **3.2 Model View Controller Architecture**

The Adesua Ye application also uses the Model View Controller Architecture. This model separates the application into 3 different parts, these are model, view and controller. This architecture enables one to get multiple views and changes do not have to affect the entire system. The Model is the lowest level of the pattern and this is responsible for handling and maintaining data. The Model for the Adesua Ye application is the Firebase real time database. Requests are sent from the view which the model has to respond to. Also, the model updates itself by responding to instructions from the controller. The view displays all or a portion of the data to the user. It ensures that data is presented in a particular format. The data would only be displayed to the user if the controller decides to. The controller is the software code that controls the relations between Model and View. The controller takes input from the user and validates this input and then modifies the state of the data model by validating the input.

#### **3.2.1 The Model**

The model of this application was built using Firebase. The model has a number of tables. The system consists of many lessons and under these lessons there are different contents. For instance, the beginner's level has identification of letters of the alphabet, and writing the letters, identifying the sound of the letters of the alphabet, combining letters to form two letter words, three letter words, four letter words and five letter words. A table is created to contain the data under every section in the beginner level. In addition to these, tables are created to store the user details and keep the path of the audio files of the lessons.

### 3.2.2 The View

The view is what the user sees. In this application, the view refers to different android activities that the user will interact with. The main views are the Welcome view, Sign up view, Sign In view, two view, three view, letters view, activities view, levels view and topic view.

### 3.2.3 The Controller

The controller is created using Android studio. Android is used to communicate with the database and display the information to the user in the view. Also, information can be gotten from the view and inserted into the model. For instance, the information from the sign up page is obtained from the sign up view and inserted into the model, which is the database.

## 3.3 Process View

The following diagrams show the various processes that will be carried out by the system.

### 3.3.1 Sign Up

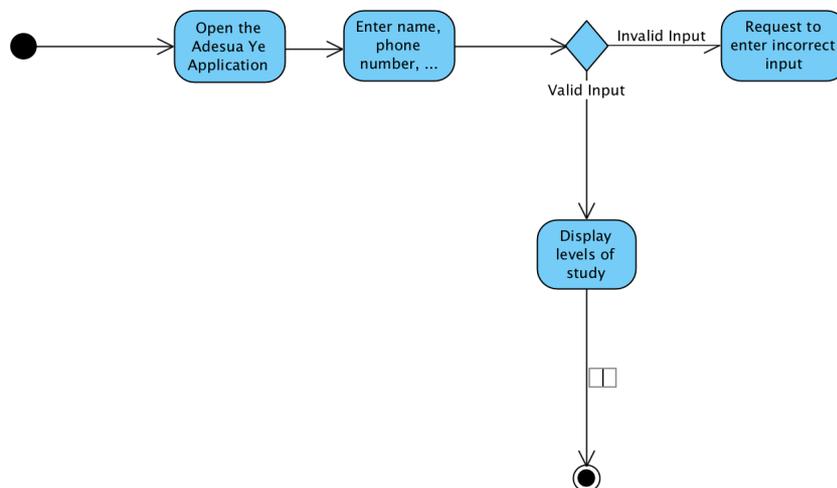


Figure 3.2 : Sign Up Activity

In the figure above, the sign up process is illustrated. The user opens the Adesua Ye Application with the tutor and chooses to sign up. On the sign up page, they would have to enter their name, their phone number, location and educational level. If any of these inputs do not meet the requirements, the user would be requested to re-enter the information. Until the requirements are met, the page for the (Levels of study page) would not be displayed.

### 3.3.2 Choose the level from the main menu

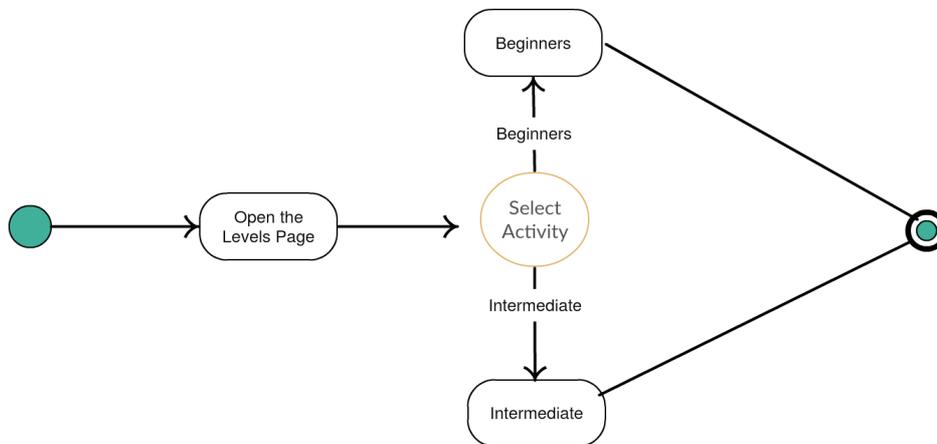


Figure 3.3: Levels Activity

This diagram illustrates the process the user goes through after signing in to the Adesua ye application. The user can choose between the beginners level and the intermediate level.

### 3.3.3 Activity View

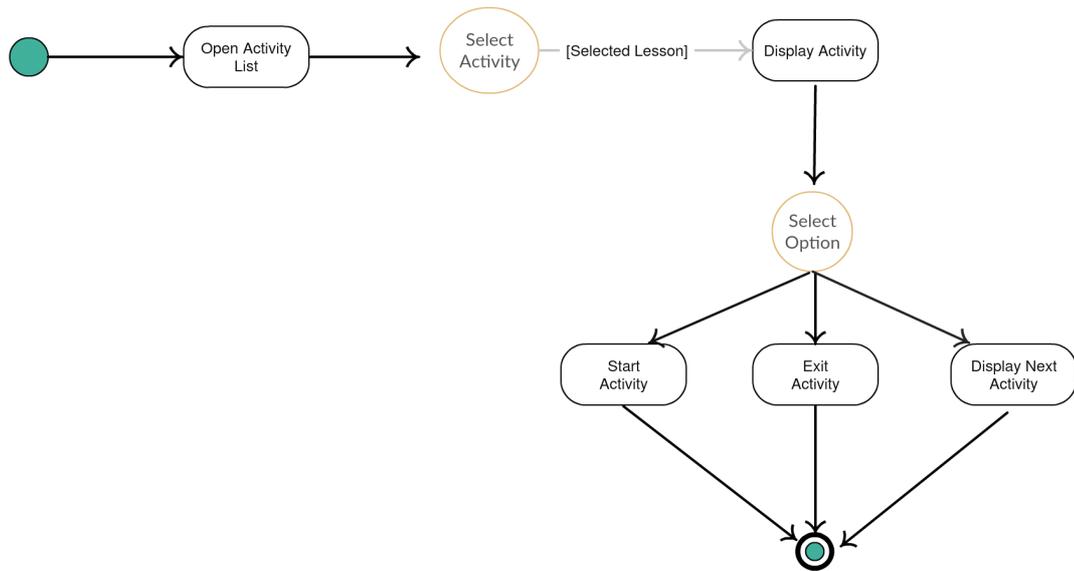


Figure 3.4: Activity View

## CHAPTER 4: IMPLEMENTATION

For this application to come into existence, different elements had to come together to make it possible. This chapter focuses on the elements that had to come together to implement the application and the approaches used.

### 4.1 Implementation Consideration

The device that the application would run on had to be considered. From the people I interviewed, most of them did not have smart phones. So the program would loan out tablets to the students through the course of their study. The people preferred the application to be on something portable like a phone or tablet so that they can use it anytime and anywhere. The tablet is an Android tablet because of how simple it is to use. The students will be taught how to use the tablet and its full functionality.

The data to be stored is voluminous and how it is going to be stored must be considered. The curriculum from the National Literacy House is voluminous and it consists of two primers. The lesson has audio files, pictures and animations.

### 4.2 Resources and Tools

These are the tools and resources that were employed to implement the application.

**Android Studio:** It is the official Integrated Development Environment (IDE) for the Android operating system designed for android development. (Android Studio, n.d.)

**Android:** It is an operating system specially for mobile phones developed by google.

**Firebase:** It is a no-sql database for mobile and web applications. It has a real-time database that enables Android integration. No-sql is closely linked to object oriented programming which makes systems simpler and more understandable. It also provides storage for images, audios and animations. It provides online and offline options so the application can function very well without the Internet.

**In-built Android folders**: Android has an in built folder that enables the user to store any form of media . The name of the folders in the Adesua Ye Application is the drawable folder and the raw folder. In the drawable folder, the images and animations were stored here. In the raw folder, the audio files were kept.

### **4.3 Operational Environment**

The Adesua Ye literacy application is operated on the Android operating system. Java was used for the backend and for the front end the Android xml layout was used. As referenced in section 4.2 , Firebase is an object oriented database. This means methods are created to extract the information in the application.

### **4.4 Implementation Approach**

The plan was to build an Android application for the Adesua Ye application. I designed particular templates to be able to call the information in. The application was divided into sign up and login, the level choice activity, the topic activity, alphabets activity, and the words activity .

#### **4.4.1 Sign Up Activity**

This is the activity that gives the user access to the full functions of the application. The user inputs details and they are stored in the database . The diagram of the database is below:

## People

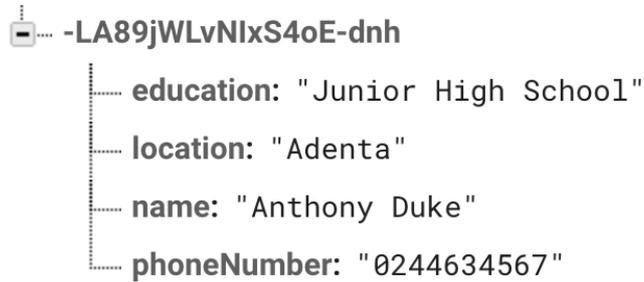


Figure 4.1: People Database

There is a column for education, name, location and phone number of the user. Before the details are entered into Firebase, they are validated in the SignUp.java page. If the details meet the requirements, the user's details are stored and they have to proceed to the Login page.

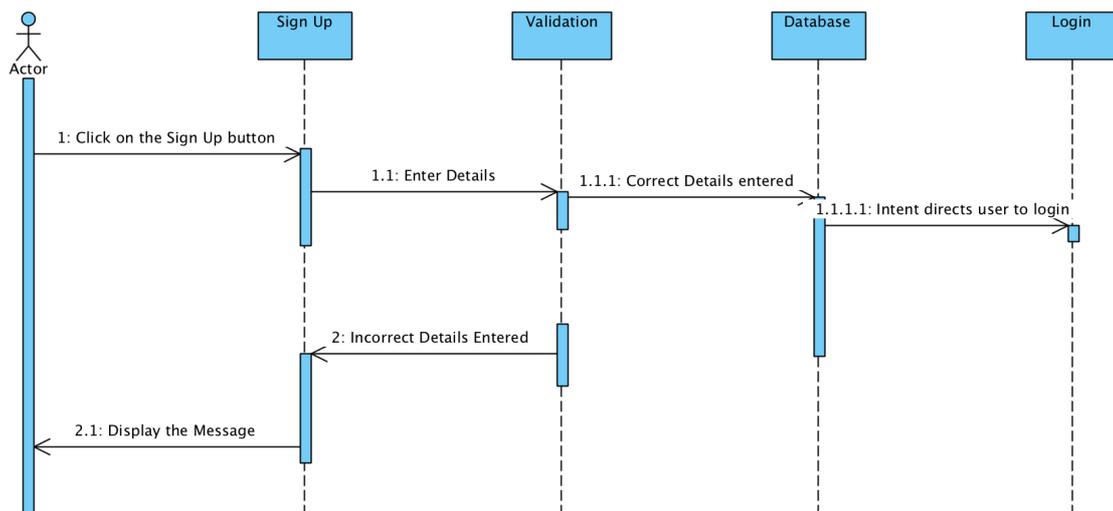


Figure 4.2: Sequence Diagram for the Sign Up Page

#### 4.4.2 Login Activity

For the login activity, the names are retrieved from the database and are displayed in a list view. The user has to identify their name and they would be directed to the next activity which is the levels page. On the levels page they have to choose between the beginner level and intermediate level.

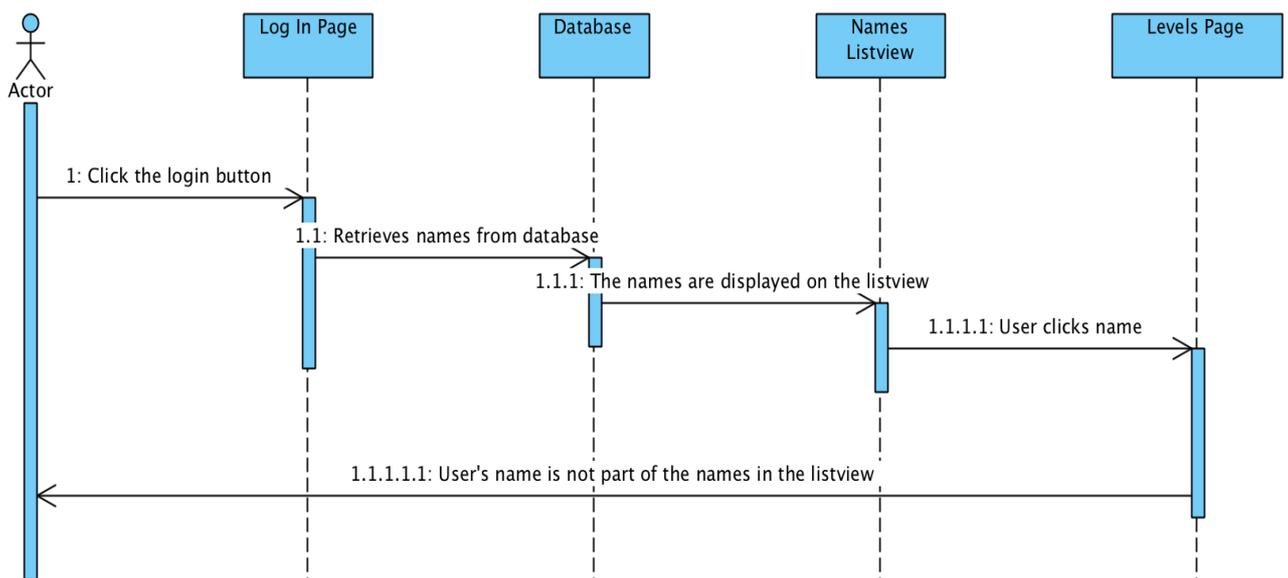
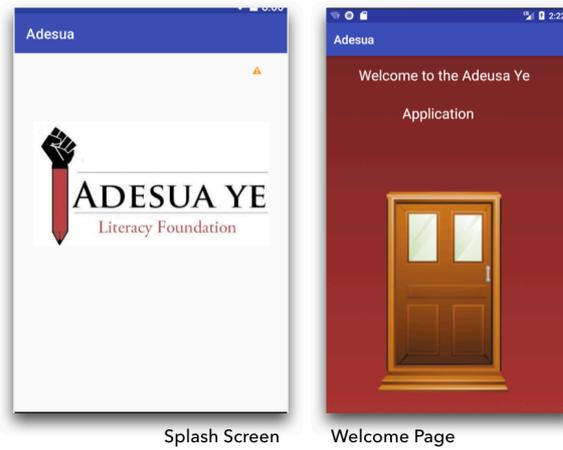


Figure 4.3: Sequence Diagram for the Login In Page

#### 4.5 User Interface Design

The eXtensible Markup Language (xml) layouts of the Android was used to design the interface of the application. The design approach used was very simple because most of the students are not conversant with the device. So this design would give them a better understanding of the functionality of the application.

Below are pictures of what the application looks like.



*Figure 4.4: The Introductory Pages*

The very first page that appears when the user opens the application is a splash screen. The splash screen displays the logo of Adesua Ye for about three seconds. The next page is the welcome activity page. This page welcomes the user and has a door that enables the user to gain access to the choices page. An audiofile plays welcoming the user and encourages them to open the door to continue on the journey. The user clicks on the door and goes to the choices page.

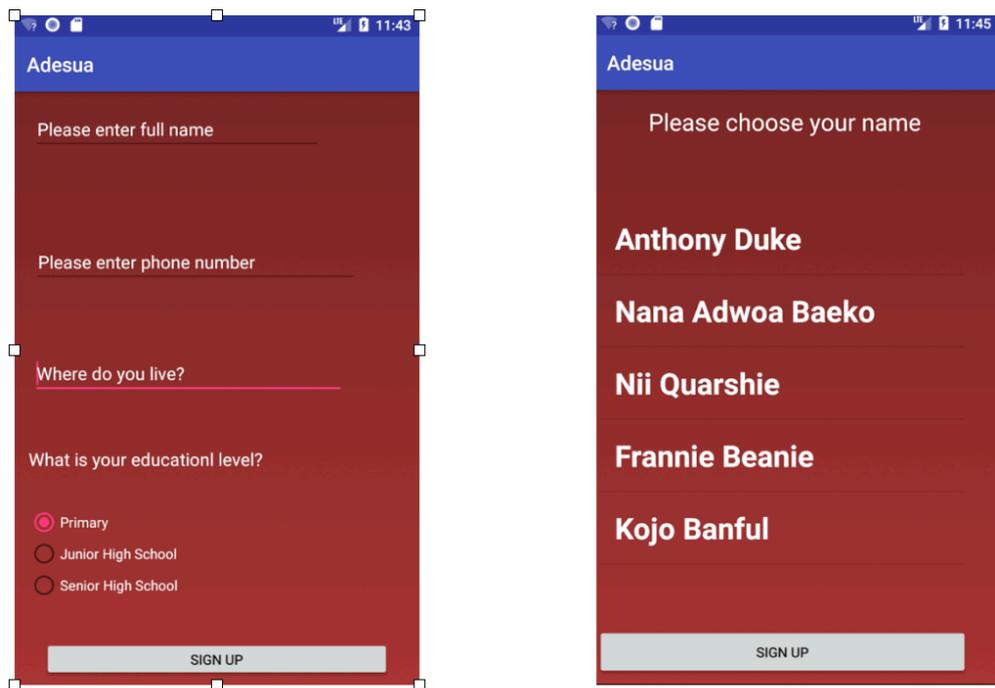


Figure 4.5: Identifying a user

On the choices page, the user looks through the list of names for their name. If their name isn't in the list they would have to sign up. This list is updated as soon as the user signs up; the real time database in Firebase makes this possible. The data is retrieved from the database and populated into the list view on this page. Immediately they sign up, they are brought back to this page to choose their name. When they click on their name, it takes them to the Levels Page. The sign up page enables the user gain access to the functionality of the application. The user has to input their full name, phone number, location and their educational level. This data is stored in the people table in Figure 4.1.

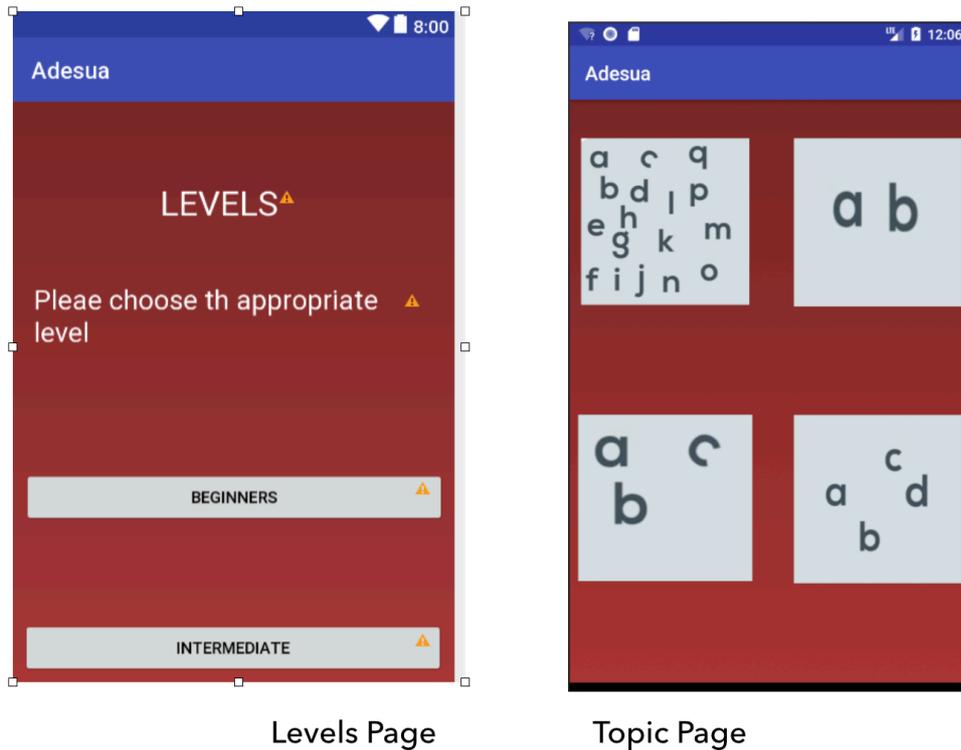


Figure 4.6: The Learning Journey

In the levels page the student chooses the class they will want to be enrolled in . Clicking on any of the buttons would send the user to the topics page. The topics page displays animations of what each topic entails. The topics page displays animations of the different letters of the alphabet. Starting from the top right, the first page teaches about the different letters of the alphabet. Clicking on this page would direct the user to the alphabets page in Figure 4.7.

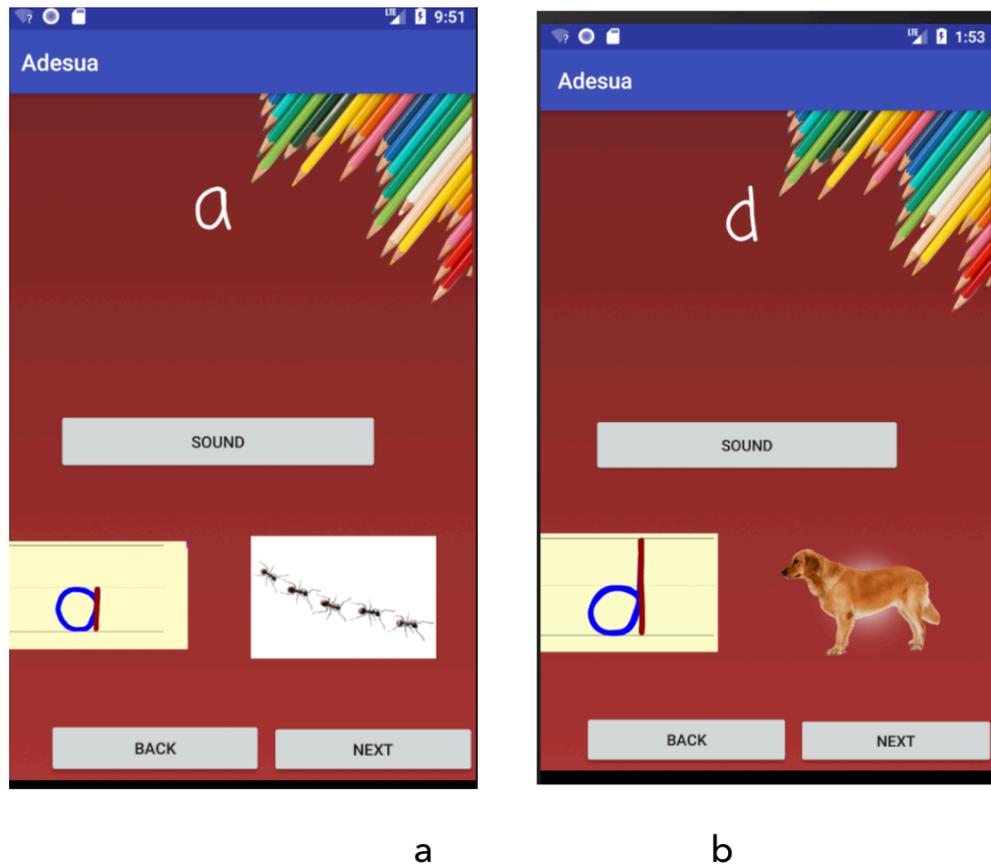


Figure 4.7: The Letters page

The alphabet page teaches about the letter A. It teaches the student to identify the alphabet and the sound for the letter A. It also displays an animation of how the alphabet is written and a picture of an object that the letter a can be found in. In this case, the word is ant. The user can go back if they have not fully grasped the details of a particular letter. They can also move to the next letter when they have grasped the concept of that particular letter.

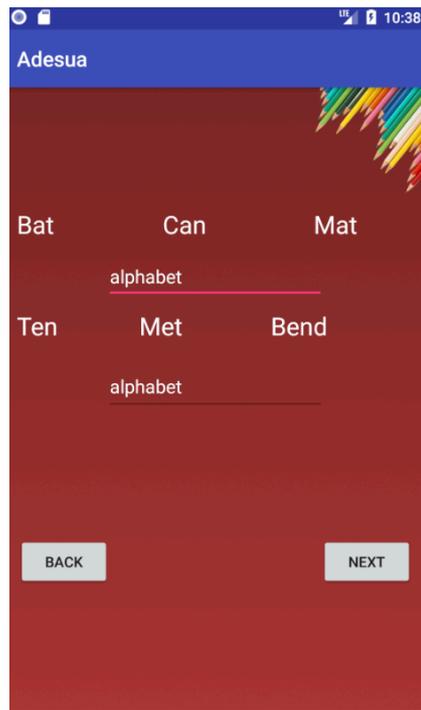


Figure 4.8 The activity page

The activity page appears after every five letters of the alphabet. The activity page gives exercises to test the student on the letters of the alphabet they have learnt . This page displays a group of words from the database and lets the student choose the letter that is common to them. After this activity, it continues back to the alphabet page to continue the other the letters of the alphabet.

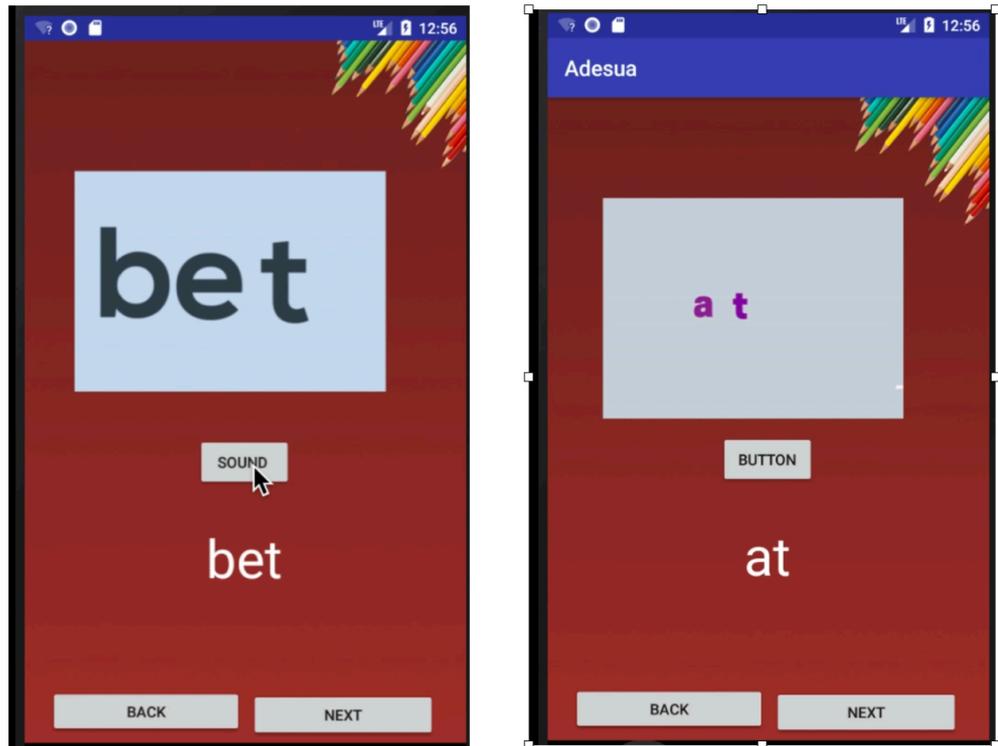


Figure 4.9 The combining letter pages

The two-letter words and the three-letter words page teaches the student how the various sounds of the letters of the alphabet come together to form a word. An animation displays how the letters of the alphabets come together to form the word.

## CHAPTER 5: TESTING

After ensuring that the complete functionality of the application has been implemented, a test was conducted to make sure my application is a fully functioning one. This chapter gives details on how the functional tests were carried out. The types of tests used were: User Testing and Component Testing.

### 5.1 Component Testing

#### 5.1.1 View Activities

This test was done to ensure that the activities were being displayed and in their right order. A particular activity was chosen Identifying Alphabets and this page linked the student to the introductory page of the alphabets activity. When the student clicks on next, they get to access the lesson pages of the different letters of the alphabet and how they are written and many more. The student can always go back to a particular lesson in the activities if they did not fully grasp the concept.

#### 5.1.2 Audio Playback

This test was to ensure that every page that has sound actually plays. For instance, on the identifying alphabets page there are sounds for the different letters of the alphabets and objects they represent. The activity in *Figure 5.1* was opened and the sound button was clicked for a letter like “d”, the result was the name of the letter , its sound and common objects that begin with the letter d.

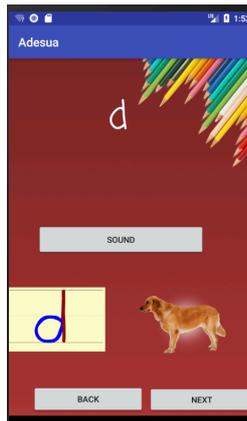


Figure 5.1 The alphabets page

## 5.2 Users Testing

This form of testing is to assess how easy it is for the user to navigate through the application and its functionality. So eventually, changes would be made based on the reactions of the user.

### 5.2.1 Testing Method

The application was given to two students on the Adesua ye program. They were given the tablets with the application installed on it. Their interactions with the application was recorded for 20 minutes.

### 5.2.2 Testing Outcome

The users were able to access the full functionality of the application. They were able to find their way around the application. They were able to click on the door to go to the Choices Page. They were assisted to sign up They were able to choose the topic they wanted to learn, access the content and perform the tasks under the topic.

## **CHAPTER 6: CONCLUSION AND RECOMMENDATION**

The entire process was an interesting learning process and challenging one as well. The Adesua Ye application meets all the functional requirements stated above in the document. The user can sign up and choose their levels. The user can access everything under the beginner's level. The user can access the audio files of all the topics and the animations and images related to the topics being tackled in the application.

Firestore gives both an online and an offline option. This way the students do not have to be dependent on the internet to access the full functionality of the application. However, updates can be made to the application and the students would have to connect to the internet to get these updates. This is more effective because if the database were to be a local database, changes would have to be made per device.

More improvements can be made to this project. The application should have another side to it where the tutor can monitor the activities of the student. This part of the device should also enable the tutor upload activities and change the current format of lessons. This way, the application would be customized to meet the personal needs of each student.

For future work, the application should expand the lessons to address other issues like health, hygiene and any general knowledge the adults need to know.

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## APPENDIX

### I. Research Interview Questions

1. What is your age range?

20-30 30-40 40-50 60-70 above 70

2. What is your occupation?

3. What type of phone do you use?

4. What do you use the phone for?

Make calls

Send text message

Send whatsapp messages

Use the internet

Take picture/video

5. How often do you use it?

6. What's your educational level?

Primary BECE WASSCE University none

(Only for Adesua ye students)

7. What has been your experience with Adesua ye so far?

For each component, rate how effective it is:

English Learning Activities 1 2 3 4 5

Math Learning Activities 1 2 3 4 5

Teacher to student relationship 1 2 3 4 5

8. Could you give a more detailed feedback on how it can be improved?

(For adults who are not students of Adesua ye)

9. Do you know what an adult literacy program is and its

function?

10. Would you enroll in one? Why or why not?

11. Would you enroll in Adesua ye? Why or why not?