

# འབྲུག་Grammar



## Project Report

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TECHNOLOGY**



**CERTIFICATE**

This is to certify that the BSc.IT. project report titled “འབྲུག་Grammar”, which is being submitted by Dorji Yangzom (12190050), Sonam Thinley (12190083), Tshering Dorji (12190093) and Kinzang Wangchuk (12190062), the students of Bachelors of Science in Information Technology, prepared during the academic year 2021 in partial fulfilment of the requirement for the award of the degree of Bachelor of Science in Information Technology is a record of the students’ work carried out at the Gyalpozhing College of Information Technology, Royal University of Bhutan, Gyalpozhing under my supervision and guidance.

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## **ACKNOWLEDGMENT**

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## **ABSTRACT**

Druk Grammar: A virtual learning application is an android application that focuses on teaching basic Dzongkha Grammar to the Bhutanese people especially the students. The Bhutanese students may have ability to speak Dzongkha but still, they don't have much idea about proper Grammar used. This is the reason why our team came up with the idea of developing an android application that allows general users to learn basic Dzongkha Grammars.

Druk Grammar has features such as quiz where user will attempt the quiz to check their understanding. The time limit for quiz to be completed is 30s. Other than that, features like giving feedback, sharing an app and exiting an app are also include in our app. Overall, the app is very interesting with advanced medias and graphics used like images, colour and audios.

## **TERMINOLOGY**

| <b>Term</b>              | <b>Definition</b>   |
|--------------------------|---|
| <b>Dzongkha</b>          | <b>The national language of the kingdom of Bhutan.</b>  |
| <b>Dzongkha Grammar</b>  | <b>Grammar that is learnt in Dzongkha</b>   |
| <b>Android studio</b>    | <b>Is the official integrated development environment (IDE) for the Android.</b>  |
| <b>Application store</b> | <b>An installed application on mobile phone which helps user to find new compatible applications with mobile phone platform and download them from Internet</b> |

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## **CHAPTER 1**

### **BACKGROUND AND INTRODUCTION**

#### **1.1. BACKGROUND AND INTRODUCTION**

Mobile communications technology has quickly become the world's most common way of transmitting voice, data, and services in the developing world. Given this dramatic change, mobile applications in general and mobile applications for education development in particular hold significant potential for advancing development. They could provide the most affordable

ways for millions of people to access information, markets, finance, and governance systems previously unavailable to them.

Dzongkha was declared as the national language of Bhutan in 1971 (Zangmo, 2015), but today after almost five decades Bhutanese in general, and especially the youths, are still having difficulty in mastering the language. Children still face difficulty in pronouncing a Dzongkha word correctly and they end up memorizing it and during special occasions, officials practice for hours, even if they just have to read out a welcome address which is probably because most Bhutanese grew up learning Dzongkha through crude teaching methods, which include memorizing contents of the textbook and sitting through boring lectures (Dzongkha: Why it is not taken seriously, n.d.). Changing times call for the need of preservation and promotion of the national language, as it is vital for a small country like Bhutan to maintain its independence. To promote Dzongkha through ICT is one of the objectives of the Dzongkha Development Commission and with increasing number of smart phone users and mobile phone penetration outpacing the other means of communication in the country, promoting Dzongkha through mobile phones is seen to be one of the most effective strategies. Bearing those objectives in mind, this project will be helping in promotion of Dzongkha through mobile application in Bhutan.

Almost everyone knows how to use all these latest phones and the applications within it, including kids and studies have shown that mobile technologies help in language learning (Norton, 2014). These technologies can be used for the betterment of our lives such as in the education of our children. However, children use smart phones and other electronic devices for playing games and other unproductive activities. While there are many apps teaching other languages like English and Chinese there are none for Dzongkha. So Bhutanese children are becoming more fluent and biased towards the English language. Therefore, with the development of this Dzongkha Grammar learning app, Bhutanese will have a better chance at learning Dzongkha, they can learn Dzongkha easily and quickly.

## **1.2 MOTIVATION**

Bhutanese nowadays are prone to the western languages influenced through the Internet, television and mobile applications. As a result most of the Bhutanese lacks interest in learning Dzongkha grammar and face problem in writing and speaking Dzongkha. Despite the government's effort to promote Dzongkha, it has seen the least number of interested learners over the years. Children's show more interest in writing, learning or speaking English as they find reading and writing in English more easier compare to Dzongkha in order to promote our national language and to make our future youths more expert in Dzongkha grammar from primary level itself.

Unlike other languages Dzongkha is not widely used and there are not many developed applications in Dzongkha. And quality education as of now is highly dependent on tutors having high degrees of personal contact with students, but with the use of technologies education can become student-centered learning and can reduce burden to teachers as well as parents. Therefore everyone should be concerned and join hands to promote it.

## **1.3 AIM**

To develop an android application for Dzongkha Grammar

## **1.4 OBJECTIVES**

The following are the objectives set to achieve aim of the project:

- To develop a mobile application Druk grammar to learn Dzongkha grammar easily and enjoyably.
- To promote Dzongkha Language through Grammar.
- To motivate students to learn grammar through mobile application.
- To launch app in Google play store.
- To provide interactive learning platform.
- To improve reading and listening skills in Dzongkha language.

## **1.5 SCOPE**

Scope of the project is within Bhutan and it is mainly for students.

To develop mobile application that deals with Dzongkha grammar for primary with following features:

- One can access without internet connection(Offline based app)
- Anyone can view to this application neither registering nor logging in.
- Content includes more than 20+ topic from Starting from lower class to higher class
- Can attempt quiz in order to get yourself aware whether you got lesson or not.
- It contains 5 different chapters.
- Sound and images are included to convince students in easier and simpler form.

## **CHAPTER 2**

### **PROJECT REQUIREMENTS**

#### **2.1 SOFTWARE DEVELOPMENT PLATFORM**

This chapter gives the information of the different software used in developing the Dzongkha Grammar App mainly Android Studio and DB Browser for SQLite.

### **2.1.1 Android Studio**

Android Studio is a new, official and fully integrated development environment (IDE) based on IntelliJ IDEA, which was launched by Google on May 16, 2013 for the Android application development (Android Studio, 2019). It is available for download on Windows, macOS and Linux based operating system.

Android Studio is packed with a lot of features that enhances the productivity of any app developed using Android Studio such as a flexible Gradle-based build system, fast and feature-rich emulator, code template and GitHub integration, broad testing devices and frameworks and built in support for Google Cloud Platform, making it simple to incorporate Google Cloud Messaging and App Engine (Meet Android Studio, 2019).

Requirements: It is supported in Windows 7 or later. Minimum of 3 GB RAM or 8 GB RAM is recommended for the smooth functionality of the software. 2GB of available disk space minimum or 4 GB disk space is recommended and 1280 x 80 minimum screen resolution (Friesen, 2019).

### **2.1.2 DB Browser for SQLite**

The version used: Version 3.11.2

DB Browser for SQLite (DB4S) is a high quality, visual, open source tool to create, design and edit database files compatible with SQLite. It is for the users and developers who want to create, search and edit databases. You can perform many activities such as create, define, modify and delete tables and records alike, search records, create and compact database files, import and export records as text, import and export tables from/to CSV files, and import and export databases from/to SQL dump files (Installation Guide, n.d.). We have used SQLite because It is serverless which means it is simple to set up and zero configuration is required, File-based system makes it very portable and Stable cross platform database file.

### **2.1.3 Adobe Photoshop**

Adobe Photoshop is a raster graphics editor developed and published by Adobe Inc. for Windows and macOS. The Adobe photoshop version used for this project is 20.0. Adobe Photoshop provides you a toolbox in Quick and Expert modes to help you work on your

photos. You can use the tools in the toolbox to select, enhance, draw, and view images. The toolbox in the Quick mode contains a small set of easy-to-use tools. The tools available in this mode are Zoom, Hand, Quick Selection, Eye, Whiten Teeth, Straighten, Type, Spot Healing Brush, Crop, and Move. In the Expert mode, the toolbox is richer than the toolbox in the Quick mode. The tools are organized in View, Select, Enhance, Draw and Modify groups.



**CHAPTER 3**

**REQUIREMENTS GATHERING**

**&**

**ANALYSIS AND METHODOLOGY**

## **3.1 REQUIREMENT GATHERING AND ANALYSIS**

### **3.1.1. FUNCTIONAL REQUIREMENTS**

This app will have five different Chapters. Each Chapter will have around 5 to 10 topics. All the chapter will be arranged in such a way that lower class grammar will be in chapter 1 and increases as the chapter goes up.

After every chapter or after going through set of topics, students can attempt quiz in to be aware of what they have learnt. While doing with quiz, If they answer the question correctly clapping buzzer will be produced and if the answer is wrong, wrong buzzer will be produced indicating the answer is wrong.

Stars are rewarded after the completion of quiz based on the score the user have got. One star is given to Question so, if user get 2 answer correct they will get one star and if 4 answer correct they will get 2 stars and so on.

### **3.1.2 NON-FUNCTIONAL REQUIREMENTS**

The non-functional requirements are

- Usability is provided to Dzongkha Grammar app user where it consists of clear images along with induced voices of native speakers that will help user to pronounce the words correctly. Moreover, it also includes buttons that is used to navigate directions, hence user can use the app easily.
- The app doesn't contain any image or voices that will outlay harm to anyone and also the content can be easily modified when needed. The use of voice and images will make the content simpler and easy for user to learn grammar.
- The app can be easily portable to different version of android and it is independent of the size of the android phone and tablets. The content of the app will be constant throughout the version and size of the android phones and tablets.

### 3.1.2 SOFTWARE REQUIREMENTS

| Items            | Specification                                       |
|------------------|---|
| Java version     | Java Standard Edition Development Kit (JDK) 8       |
| Operating System | Microsoft Windows 10/8 (32- or 64-bit) or ubuntu 20 |
| Android SDK      | Android SDK version 16                              |
| Android Studio   | Version 3.0 and above                               |
| DB Browser       | Version 3.12.2                                      |
|                  |   |

*Table 1 software specification*

### 3.1.2 SOFTWARE REQUIREMENTS

| Item              | Specification                         |
|-------------------|---------------------------------------|
| Disk Space        | Java Standard Edition Development Kit |
| Screen resolution | 1280x800                              |
| RAM               | 4-16GB RAM                            |
| Laptop            | 3icore +                              |
| Processor         | 2.X86-64 processor                    |

*Table 2 hardware specification*

## 3.2. Literature Review

### 1. Paper Review

#### a. Use of Smart phone application in English language learning

According to an article by Jaroslav Kacatl and Blanka Klimova (2019), hardly any younger person can imagine life without mobile technologies. They use them on a daily basis, including in language learning. Such learning supported with mobile devices is called mobile learning, which seems beneficial especially thanks to the unique features of mobile applications (e.g., interactivity, ubiquity, and portability) and teachers' encouragement and feedback.

The purpose of the study was to explore original, peer-reviewed English studies from 2015 to April 2019 and to determine whether mobile applications used in the learning of English as a foreign language are beneficial and effective.

The results reveal that mobile learning is becoming a salient feature of education as it is a great opportunity for foreign language learning. Its key benefits are as follows: the enhancement of the learner's cognitive capacity, the learner's motivation to study in both formal and informal settings, the learner's autonomy and confidence, as well as the promotion of personalized learning, helping low-achieving students to reach their study goals. Although mobile learning seems to be effective overall, it is desirable to design, plan and implement it with caution, according to students' needs, and to deliver multiple language skills in authentic learning environments.

**b. How students can use mobiles to learn English**

The article by Joanna (Norton, 2014) did a comparative study of teaching English language with desktop computers vs mobile devices and concluded that even though desktop is an invaluable resource for language teaching, mobile devices are more advantageous. Mobile devices allow the learners to interact seamlessly with each other, in both formal and informal learning contexts, and have added features like camera and microphones which aids the learning process. Camera can make learners to 'notice' grammar around them through photographs of street signs, menus, advertisements that they see around them.

**c. A study on the effectiveness of English grammar teaching and learning in Chinese junior middle school**

The results indicate that the effectiveness in English grammar teaching and learning is not satisfactory. And the grammatical competence is not correlated with the goals and objectives of the National English Curriculum. There is significant demand for teachers to encourage students to improve the efficiency and accuracy of English grammar. The outcome is useful for foreign language researchers to know better about current situation of grammar teaching and learning in Chinese junior middle schools. Although it takes teachers and students a great amount of time to get access to English grammar teaching, the effect is not that obvious. Analyzing different approaches and problems related to each approach, Ellis (2006) states that teaching grammar is undoubtedly necessary for mastering the language, for achieving accuracy and fluency.

**2. Related mobile app review**

Under this section we will discuss about the app that are related to our apps which help in promoting native languages.

#### a. Kids learn Dzongkha

Kids learn Dzongkha is the existing app developed by group of students in CST (college of science and technology ) with the aim to help every Children in Bhutan to learn at least a basic Dzongkha language which covered in the lessons of this app. This app has different section and every section is made interactive using audios, pictures and quizzes

#### b. Learn English Grammar

Learn English Grammar is the one of the best app for learning English grammar which covers up 100+ popular topics using simple example and colorful pictures. This app has got very good review from customers and it is also helping in learning native languages. After reviewing this application we came to know that our application will also effective and interactive learning since this type of Dzongkha grammar learning platform is not available in play store too.

### 3.3 METHODOLOGY

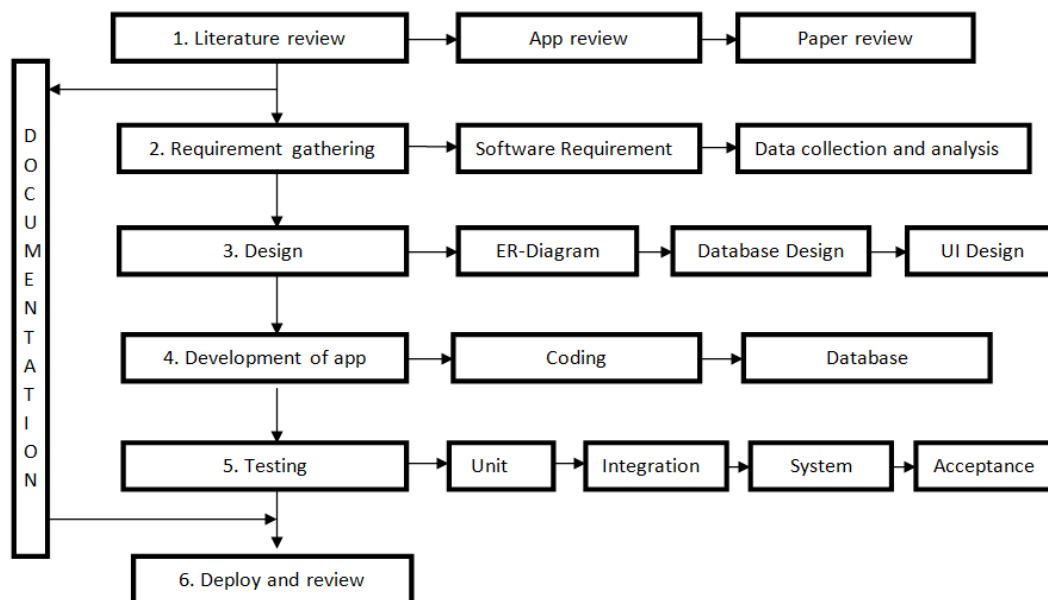


Figure 1. Methodology of project

#### Installation of software and tools

Installing of android studio and JDK (java development kit) for development.

## **Literature review**

The project will be doing literature review for the feasibility study.

Literature review includes Paper and Related mobile App review;

Paper and mobile app review are done based on the published papers and the app that are related to our apps mainly to support our topic and to get more ideas on our topic. After reviewing the papers we got to know more about why our project is important and what features we have to include in Druk grammar app. Literature review is discussed in briefly in above section.

## **Requirement gathering**

Requirement gathering includes gathering of information on software development and referring book and watching tutorials related to android application development.

## **Design**

Design phase includes designing a database, designing user interface, app logos and understanding the functionalities, flow of information, keeping the design concepts in mind.

## **Development**

The development phase includes coding using android studio and will initiate the following prototype model which will ensure low risk of project failure and greater flexibility of adjusting to the changing need and requirements.

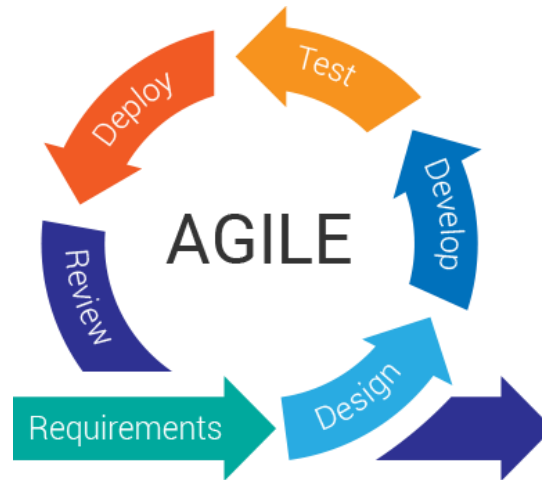
## **Testing**

After the development phase, “Druk Grammar” application will undergo testing phase where the developed app will be integrated to check its functionalities. If any bug is encountered, the development team will solve the issues and run more tests to ensure proper functionalities of the application.

## **Final documentation**

The final activity of the team is to prepare the project report, user manual and finally conclude with the final presentation.

## **Development model**



*Figure 2. Project Model*

We chose to use agile software model to develop our project because of the following benefits suitable for developing a web application:

- 1 Errors can be detected easily
- 2 Missing functionality can be identified easily
- 3 Preview the final product

## **CHAPTER 4**

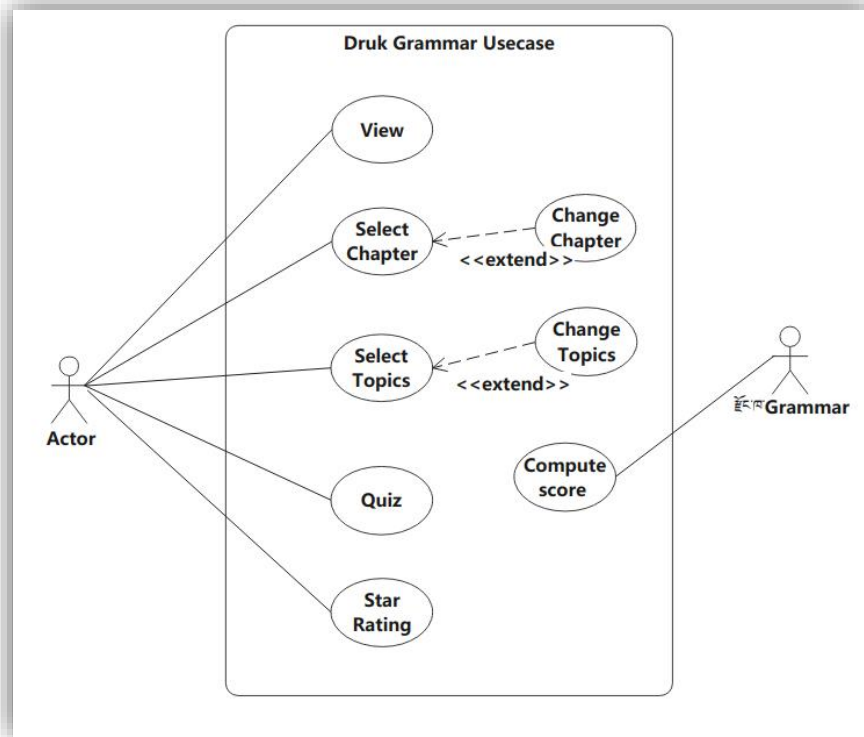
### **DESIGN AND IMPLEMENTATION**

#### **4.1 Use case**

A use case models the functionality of a system as perceived by outside agents, called actors that interact with the system from a particular viewpoint. Its main purpose is to help development team visualize the functional requirements of a system, including the relationship of actors to essential processes and also among different use cases.



The actor identified for this project is any user of the app. The interactions of the actor and its functionalities are shown below.



*Figure 3. Usecase Diagram*

## 4.2 Sequence Diagram

Sequence Diagrams are used to focus the time as well as to show the order of the interaction visually with the help of vertical axis that will represent the time in order to send messages. It validates the logic of the working of app within itself and also the user who uses. This diagrams explain the detail logic attempting the quiz and awarding of star.

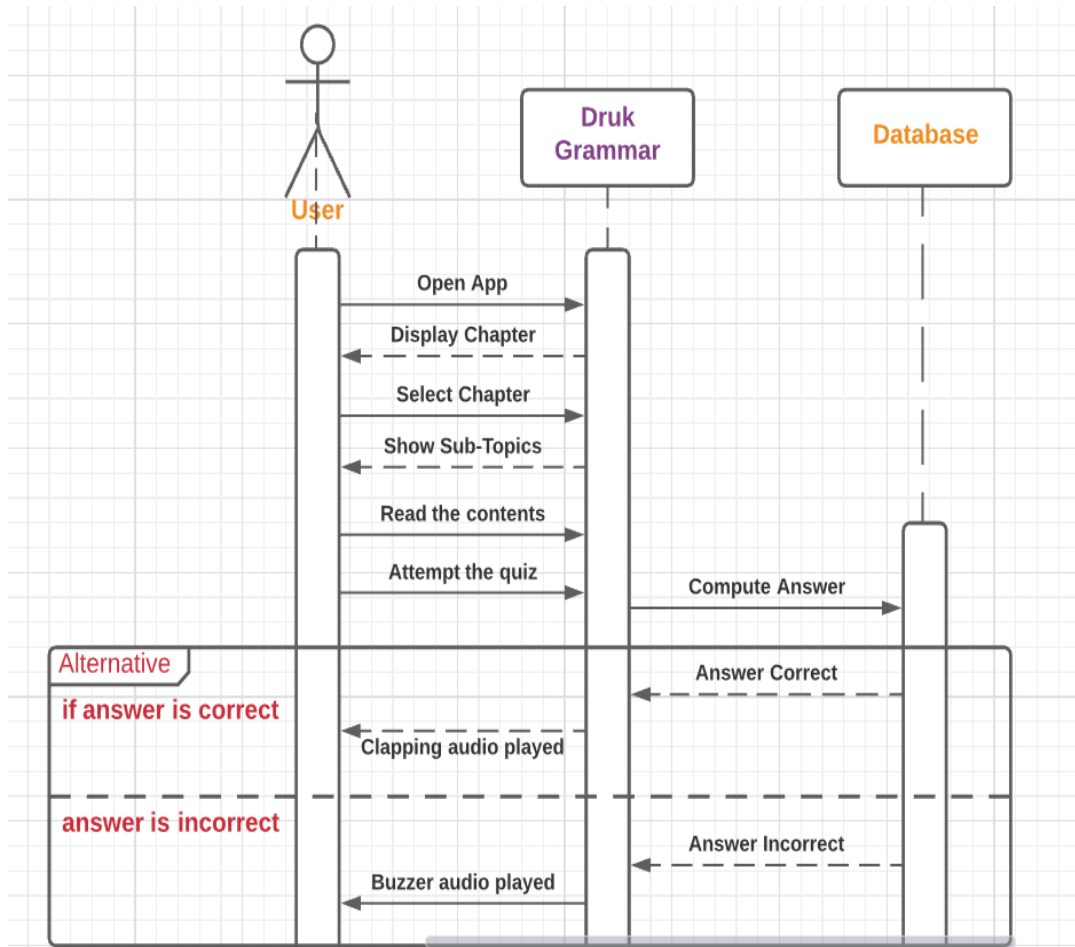


Figure 4. Sequence Diagram

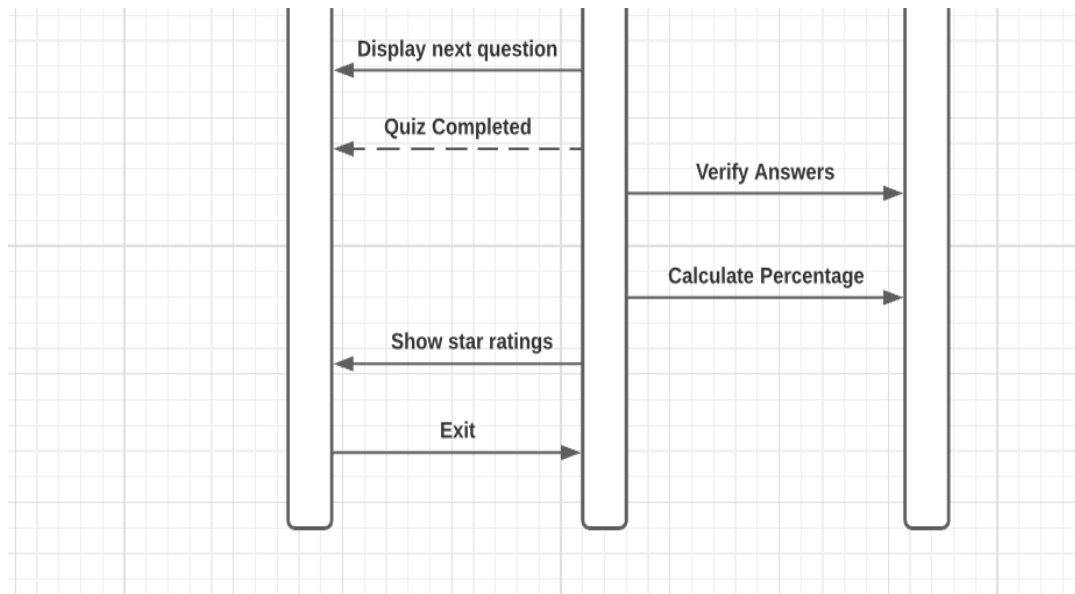


Figure 4.1 Sequence Diagram

### 4.3 Prototype Design

The proposed prototype of the apps consists of 5 different chapters. Each chapter will have around 5 to 10 topics and one quiz. Level of content increases a chapter increases.

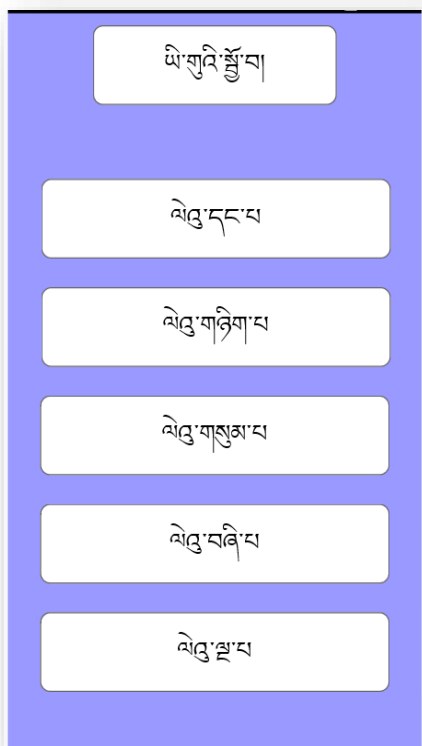


Figure 5. Chapter Selection

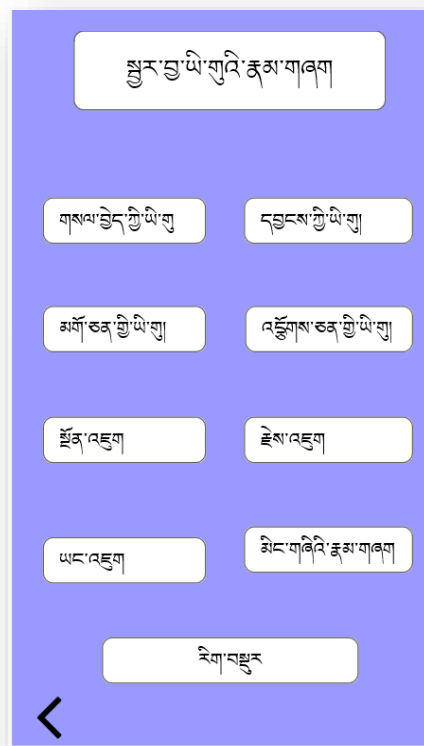


Figure 6. Topic selection

In the each topics, the user will be provided a description of the topic, sound, images and some examples.

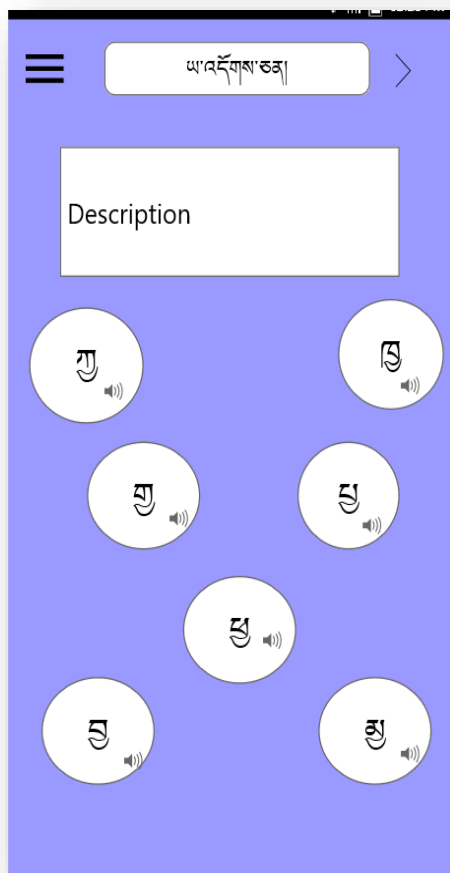


Figure 7. Content Layout



Figure 8. Audios and images

In each chapter there is one quiz each and there are 10 questions in each quiz. If the selected answer is correct the right buzzer will produce and if the answer is wrong the wrong buzzer will produce. Rewards are awarded right after completing the quiz, if all answers are selected correctly five stars are awarded. One is give for questions.

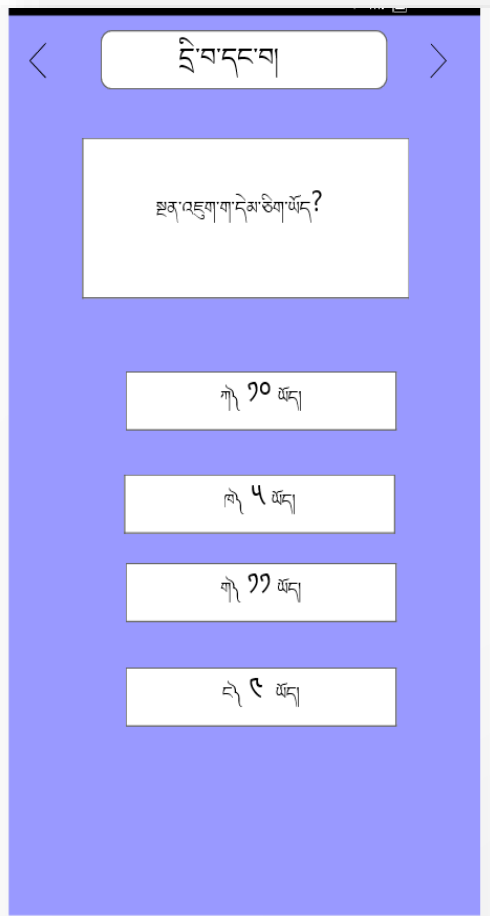


Figure 9. Quiz Layout



Figure 10. Star Rating

## 4.4 Database Implementation

### 4.4.1 Entity Relationship Diagram

An entity relationship diagram is a type of flowchart that illustrates how entities such as people, object or concepts are related to each other within a system. It is also a graphical representation of entities and their relationships to each other, typically used in computing in regard to the organization of data within databases or information system.

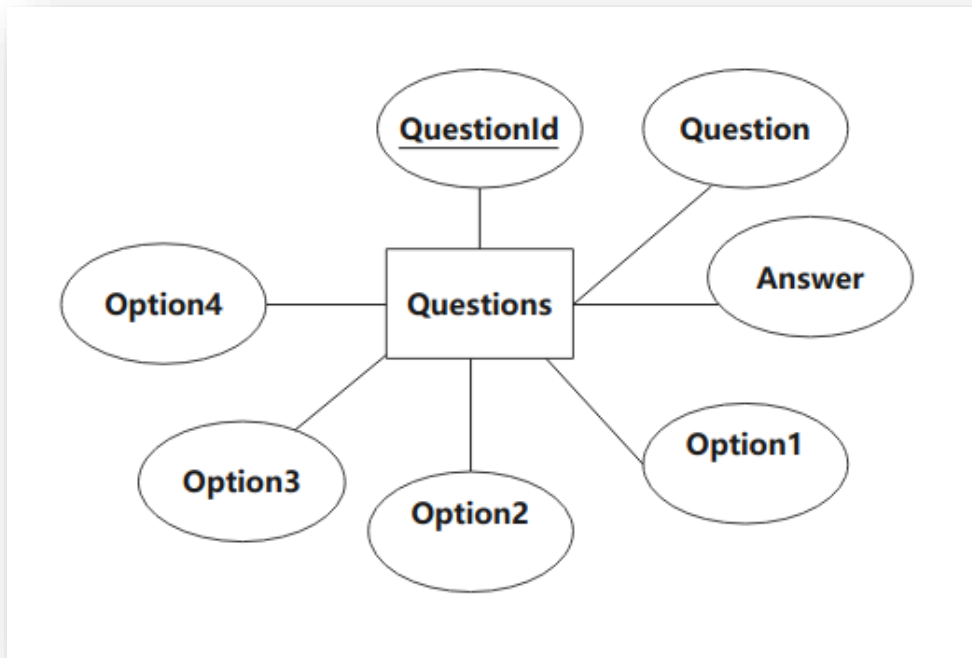


Figure 11. Entity Relationship Diagram

At the conceptual level, design of the database starts with identifying entities, attributes and primary key for each entity. Entities are specific objects or things in the mini-world that are represented in the database. Associated attributes for each of the entities are identified and the also the most appropriate primary key is chosen for the table to be uniquely identified.

The above figure shows the entity relationship diagram for the Druk Grammar App.

#### 4.4.2 Relational Scheme

The figure shown below has a entity called Questions and Question entity has QuestionId as primary key which has been underlined and Question, Answer Option1, Option2, Option3, Option4 are some of the attributes of Question entity.

Questions

| <u>QuestionId</u> | Question | Answer | Option1 | Option2 | Option3 | Option4 | QuizId |
|-------------------|----------|--------|---------|---------|---------|---------|--------|
|-------------------|----------|--------|---------|---------|---------|---------|--------|

*Figure 12. Relational Scheme*

## **CHAPTER 5**

### **RESULT**



## 5.1 App Overview



Figure 13. App Icon



Figure 14. Splash Screen Of App



Figure 15. Chapter Selection

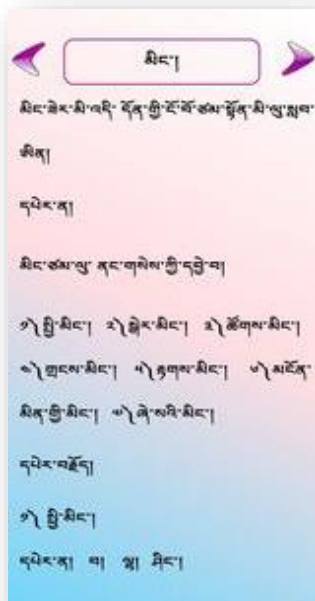


Figure 16. Topic Selection

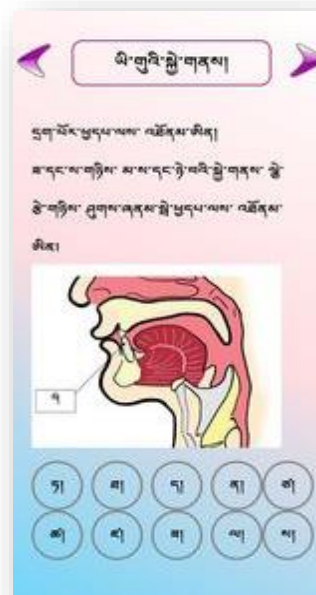


Figure 17. Content Layout

Figure 18. Audio and video



Figure 19. Quiz Layout



Figure 20. Star Rating



Figure 21. Side Menu

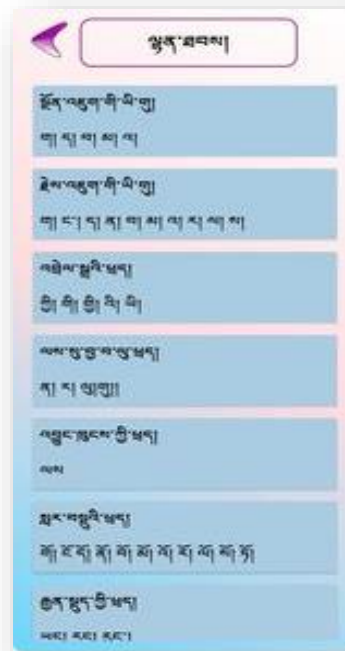


Figure 22. Supplementary text

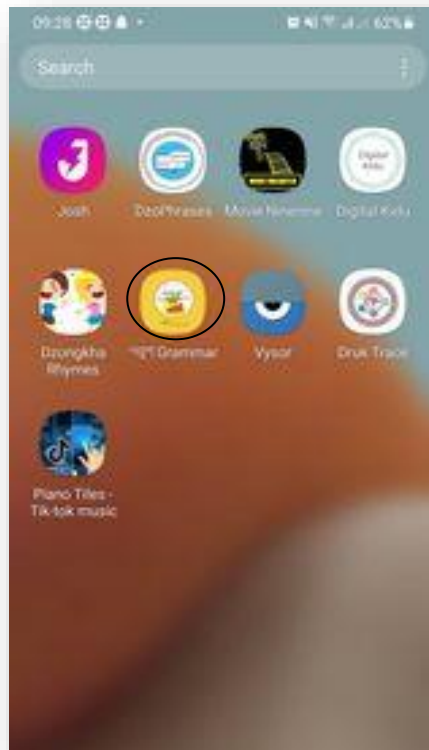


*Figure 23. Guide*

*Figure 24. Developers*

## 5.2 User Manual

- A. In order to download the Dzongkha Grammar App, First User have to get access to Play store
- B. Search the apps and then click on the app to download it.
- C. The user will be directed to the Download page.
- D. Click Install to download the App.
- E. After the App gets installed, open the App.
- F. You can also open the installed App from the Home Screen of the user's phone.



*Figure 25. App icon*

G. The user will see the splash screen of the App as displayed below.



*Figure 26. Splash Screen*

H. When the user first accesses the Home Page of the App, There will Five Chapters



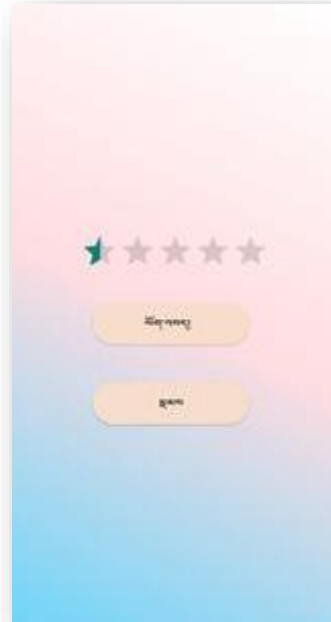
*Figure 27. Select chapter*



- K. After each chapter there are set to question to solve in the form of quiz and star rating will also be given based on the score and quiz includes Timer and the Score to keep user on track.



*Figure 31. Quiz Layout*



*Figure 32. Star rating*

- L. When user click on the navigation drawer in Home screen side drawer will be displayed.



*Figure 33.Navigation drawer*



*Figure 34.Navigation drawer displayed*



## **CHAPTER 6**

### **TESTING**

## **5.1 User Testing**

The users of this app are youths, children and Bhutanese citizen as a whole. So, it is very important for it to be tested by the different kind of users. The test was accomplished with different study background.

When the app was given to them, they were very happy and delightful by beautiful designs and the interactive contents. For them to get know of this app, they didn't need any instruction and guide for that, so it shows that users were ready and exited to endeavor this app.



*Figure 35. User checking Druk Grammar*

## **5.2 Unit Testing**

In here individual units are checked for errors and loops and, aggregated to see whether it works as planned. This was done for various specific components. For example, like sharing the app, giving feedbacks and buttons, Every units are uptight.

### **5.3 Integration Testing**

The main focus was on the integration of dynamic and static part of the project. So far, no problem has arisen and app is smooth.

### **5.4 System Testing and Acceptance Testing**

When all other different testing is done, the project went under system testing and acceptance testing. And made ready to deploy.

### **5.5 Usability Testing**

Usability testing was checked if the application is easy to use. And how the user was quick to learn about the app, like where the side panel and dynamic section are placed. It includes remembrance of the app functions, efficiency and friendliness.

## FUTURE WORK PLANS

1. Increase the contents and number of quiz questions.
2. Elaborate contents with more examples.
3. Use more advanced Medias and Graphics.

## CONCLUSIONS

Druk Grammar is a mobile based android application that aims at improving the Dzongkha Grammar of Bhutanese people especially the students. Dzongkha Grammar must be learned thoroughly to improve Dzongkha speaking and writing skills which will directly help in promoting Dzongkha language as well as Bhutanese cultures. The contents for this app are selected after consulting with several Dzongkha teachers and in future the contents of the app will be increased. Overall the app will look interesting with different media and graphics used. So after publishing this app, the users will be introduced to whole new platform for learning Dzongkha Grammar.

## ACHIEVEMENTS

The system scopes of our app are:

1. App has medias like sound and pictures
2. Offline based
3. Contains 5 chapters
4. Quizzes

All the Scopes of our project are achieved.

## References

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