

# Development of an Android-Based E-Learning System for the Hausa Language

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## ABSTRACT

E-learning is an educational measure that uses computing, mobile, and networking knowledge to aid learning methods. Several languages have been employed in the use of web-based learning systems. This paper presents an Android-based e-learning application for the Hausa language using hypertext pre-processor (PHP), Javascript with MySQL for its database and Android as its platform. It was deployed on the cloud to help individuals study the basis of the Hausa language at their convenience and make it accessible when on transit. Self-tests are given to test personal improvement. The proposed e-learning system for Android devices is user-friendly, easy to access, and reliable as compared to existing e-learning platforms.

(Keywords: e-learning, PHP, Android, Hausa language)

## INTRODUCTION

A general, persistent, and frequent dilemma in Nigeria and beyond is the challenge of multiple languages. With a total population of about 183,523,432 (as of 2015) (Emmanuel, et al., 2016), Nigeria as a multilingual country with three major languages: Hausa, Yoruba, and Igbo (Hanna, 2012) with English language as the Lingua Franca. Hausa is the largest ethnic group in West Africa (Adebayo, 2003). Hausa is the Chadic language with the largest number of speakers, spoken as a first language by about 35 million people and as a second language by about 18 million people in Nigeria and millions more in other West African countries (Hanna, 2012).

Originally, the language of the Hausa people stretching across southern and northern Nigeria, it has developed into a Lingua Franca across much of western Africa for purposes of trade. Hausa is spoken in Kano, Sokoto, Katsina, Bauchi, Borno, Kaduna, and some parts of Niger, Abuja, and Kogi, in Nigeria. In West Africa and the above

states mentioned, Hausa is the Lingua Franca for trade and communication, though not to say it's the only language they know, but it is their first language, and the major means of communication (Adegbite, 2004). A need has therefore arisen for people new to the area, or of another tribe, trading or residing in the area, to have a knowledge of the Hausa language.

Innovation in information technology has led to e-learning as a reliable tool for spreading educational materials outside the conventional classroom environment (Dumas, 2015). Although the traditional education model has made great progress, no true sense of mobile learning has yet developed. Problems, such as learning system instability, poor operational systems, resource limitations, and limits in learning time, flexibility and interaction exist in the current educational model (Di, Wang, and Zhang, 2012).

In this paper, an Android-based Hausa e-learning application is developed to teach the Hausa language and provide the learner the opportunity of learning and taking quizzes at convenience.

## LITERATURE REVIEW

There are numerous proposals for e-learning in the literature and in the market. Nowadays, the web-based and mobile-based application systems are frequently used. Software is now developed as technology tools to impact knowledge for individuals. Mobile applications are easy, user friendly, and not expensive for Android phones (Karlson, Meyers, Jacobs, Johns and Kane, 2009).

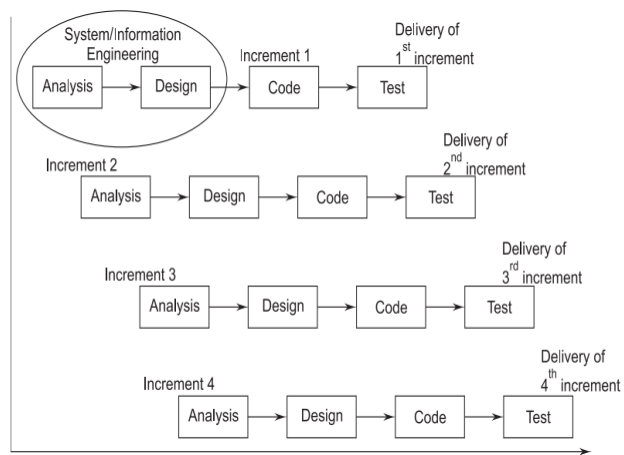
Oyelami (2008) proposed and developed an e-learning software for Igbo language, that enables prospective learners to learn the rudiments of the language at their convenience especially where there is limited or no Internet connectivity in order to arrest the extinction that looms over the

language, he used a stand-alone system with the implementation in Java.

Adeyanju, Omotosho, and Fatunde (2015), proposed a Yoruba Language E-Tutor for windows phones, the application was developed using C# on Visual Studio with XML for its database. The portable application offers a high degree of privacy through its password protection feature with the user having the ability to learn how to read alphabets, numbers and common words in Yoruba language. Self-assessment questions are also provided to test how much the user has learnt after every module.

## DESIGN METHODOLOGY

The System Development Life Cycle (SDLC) that is used for the software development is iterative-enhancement model. The iterative-enhancement model combines elements of the linear sequential model (applied repetitively) with the iterative philosophy of prototyping. In this model, the software is broken down into several modules, which are incrementally developed and delivered. First, the core module of the system and then it is later refined into increasing levels of capability of adding new functionalities in successive versions (Agarwal, Tayal, and Gupta, 2008).



**Figure 1:** Iterative Enhancement Model (Adapted from Agarwal et al., 2008).

The first increment of the proposed approach includes its core modules and functionalities, the learning modules, and the test modules. The proposed approach was deployed on the cloud after its development. The tools used are PHP,

JavaScript, HTML, and CSS. Its database was design and developed on MYSQL.

## TECHNOLOGY USED

### Android Operating System

Android is a mobile operating system (OS) based on the Linux kernel and currently developed by Google (Tamhane et al., 2015), with a user interface based on direct manipulation. Android is designed primarily for mobile devices such as smartphones and tablet computers. Recently, from 2013 on, Android have become the most popular mobile OS world-wide, and its devices sell more than Windows, iOS, and Mac OS devices combined, with sales in 2012, 2013 and 2014 close to the installed base of all PCs.

Initially developed by Android, Inc., which Google backed financially and later bought in 2005, Android was unveiled in 2007 along with the founding of the Open Handset Alliance, a consortium of hardware, software, and telecommunication companies devoted to advancing open standards for mobile devices. The operating system's success has made it a target for patent litigation as part of the so-called Smartphone Wars between technology companies (Di, Wang and Zhang, 2012). This paper uses an Android application to deploy the developed Hausa e-Learning on Android-based phones.

### Database Design

In designing the database, all entities were identified and defined as well as the interactions between the entities. The identified entities include User, Profile, Alphabets, Numbers, Days of the week, Conversations, Human Body, Animals, Question, Answer, and Results.

The User entity has attributes of User ID, First Name, Last Name, E-mail, Username, and Password with the User ID as its primary key.

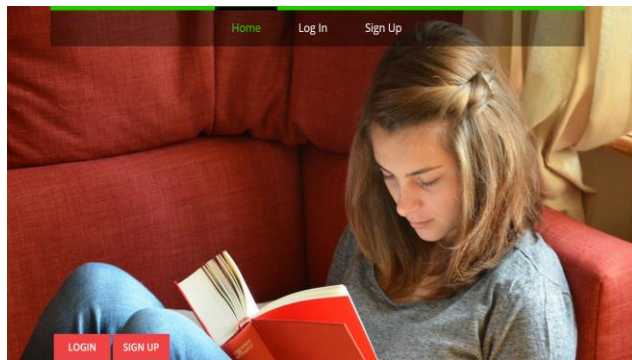
The Profile entity contains the attributes User ID. It has relationship with User, Quiz, Alphabet, Numbers, and Part of the Body entities. The Alphabet entity is used to represent Hausa alphabets. The Number entity represents Numbers in the Hausa language. The Parts of the Body entity denotes Hausa names of the

parts of the body and their descriptions. The Number entity characterizes numbers in the Hausa language. The Animal entity symbolizes the Hausa names of selected animals and their descriptions. The Question entity contains the questions and relates with the profile entity. Users can take questions while the Admin updates the question library. The Answer entity contains attributes to store answers relating to questions as results. Each answer yields a result. The Result entity specifically functions as storage of test results taken by Users and attaches it to the user that took the question.

### **Hypertext Markup Language (HTML)**

HTML is a markup language for describing web documents (web pages). A markup language is a set of markup tags. It was used in designing the application before conversion into the Android application.

### **RESULTS AND DISCUSSION**



**Figure 1:** Hausa E-Learning Homepage.

### **Module Description**

The system is designed with the homepage giving users' privilege to sign-up and login. It requires users to enter a username and password before being granted access into the system.



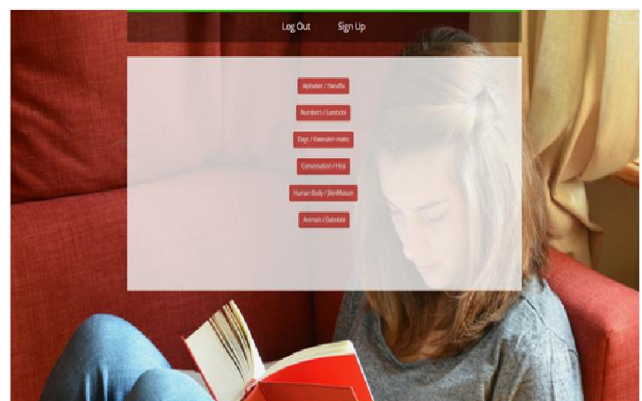
**Figure 2:** Hausa E-Learning Signup Module.

The signup module gives a new user the privilege to create his/her profile and a unique username to be used in learning at convenient time.



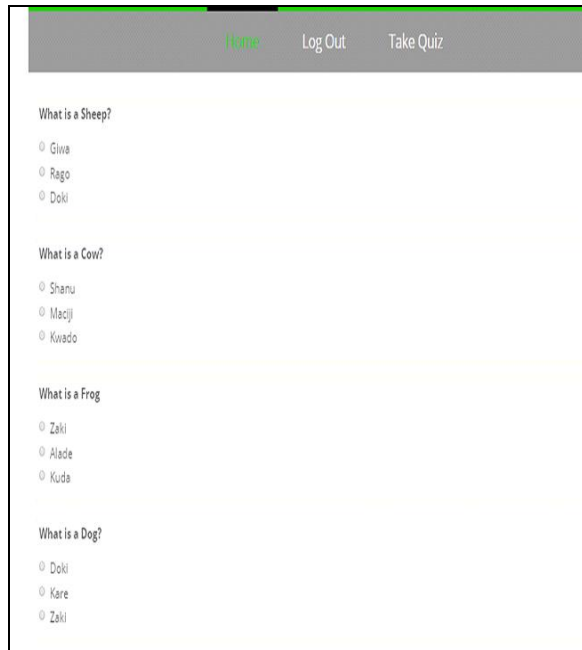
**Figure 3:** Hausa E-learning Login Module.

The login module is where users are granted access into the learning forum, it requires a unique username and password which has been registered by a particular user.



**Figure 4:** Hausa E-learning Select Activity Module.

These modules cover the learning/studying of the activity selected by the user. Each activity differs from the other. There are several learning-activity modules in the system: Alphabet, Numbers, Days, Conversations, Human Body, and Animals. The learner selects a learning activity and afterwards clicks the quick test button to take a quiz.



**Figure 5:** Hausa E-learning Quiz Activity Module.

The quiz module tests the knowledge gained by individual user after going through the e-learning activities.

## CONCLUSION

In this paper, an e-learning system for Hausa language is developed. Hausa language is a complex language, many people that find themselves in the Hausa speaking part of Nigeria needs to communicate and understand the language. Hence, the need for proposing a method which can facilitates the learning of the language for effective communication.

E-learning systems have a large advantage over traditional learning environment. Developing an android based e-learning system for the teaching and learning of the Hausa language is a good innovation to help learners to get familiar with the language, especially when such a system is working with individual convenience.

This work has been developed to help individual learn Hausa language as one of the minor languages of the world, it is an android based language learning system.

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